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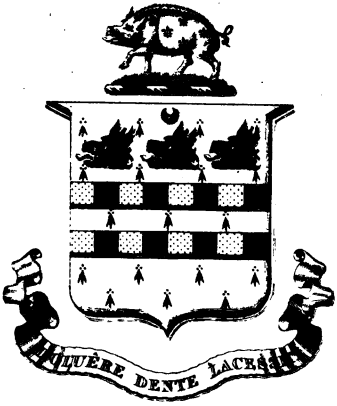

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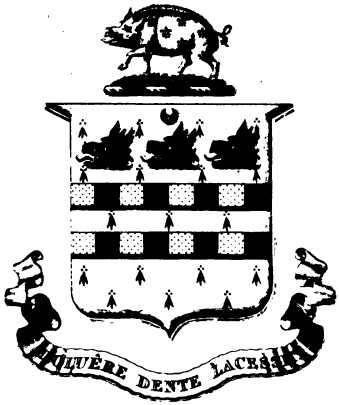

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CALEB WHITEFOORD, ESQR F.R & A.S.

Late a Vice President of the Society for the Encouragement of Arts, Manufactures & Commerce.

Engraved by Wm Holl, from an original Painting by Stuart, in the Possession of Mrs Whitefoord.

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TRANSACTIONS

OF THE

SOCIETY

INSTITUTED AT LONDON,

FOR THE

ENCOURAGEMENT

OF

ARTS, MANUFACTURES, AND COMMERCE;

WITH THE

PREMIUMS offered in the Year 1811,

AND

THEIR RULES AND ORDERS.

VOL. XXIX.

LONDON:

PRINTED BY R. WILKS, CHANCERY-LANE.

Sold by the HOUSEKEEPER, at the SOCIETY' HOUSE, in the ADELPHI; and by Messrs. ROBSON, J. WHITE, BECKET, JOHNSON, CADELL and DAVIES, PHILLIPS, WALTER, RICHARDSON, LONGMAN and REES, TAYLOR, and WYATT

MDCCCXII.

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PREFACE.

THE PORTRAIT prefixed to the present Volume is that of CALEB WHITEFOORD, Esq. late a VICE PRESIDENT of the Society; it is beautifully engraved by Mr. Holl, from an original painting by Stuart.

Mr. WHITEFOORD was one of the oldest contributors to the Society; he was elected a Member in the year 1762, a Chairman of the POLITE ARTS in 1786, and one of their VICE PRESIDENTS in the year 1800.

The great attention which he always paid to the interests of the Society, and his active services, naturally claim a more particular account of him then is usually given in our Preface on similar occasions, and we doubt not of the following sketch being very acceptable to our readers.

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CALEB WHITEFOORD, Esq. born at Edinburgh in the year 1734, was the only son of Charles Whitefoord, of Ayreshire, formerly Colonel of the Fifth Regiment of Foot. At an early age he was placed in the school of Mr. Mundell, and afterwards completed his education at the University of Edinburgh, where he made so great a proficiency in classical knowledge, that his father intended him for the Church; but finding his son had strong objections, he brought him to London, and placed him in the counting-house of his friend Archibald Stewart, Esq. M. P. an eminent wine-merchant in York-buildings, where he remained four years; he then went to France, where he continued two years, till he became of age; and returning to London, commenced business, by entering into partnership with Mr. Thomas Brown, of Craven-street, in the Strand.

Here the celebrated Doctor Benjamin Franklin, being his nearest neighbour, and Mr. WHITEFOORD being eager in the pursuit of knowledge, a friendly intercourse soon commenced, which continued throughout life.

In the year 1782, Lord Shelburne became Minister, and being determined to put an end to the American War, Mr. WHITEFOORD was selected as a proper person to be sent to meet Dr. Franklin at Paris, to negotiate the Preliminary Treaty of Peace with America. In this business he was employed during the greatest part of that year; and having succeeded

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succeeded in his object, His Majesty for that service was pleased to grant him a pension.

Possessed of a considerable share of wit, humour, and learning, Mr. WHITEFOORD lived in habits of intimacy with the greatest geniuses of the age. He was a Member of the Royal Societies of London and Edinburgh; the Society of Antiquaries; the Philosophical Society of Philadelphia; and the Arcadian Society of Rome; and one of the VICE PRESIDENTS of the Society for the Encouragement of Arts, Manufactures, and Commerce, of which he had been a Member 48 years.

In his younger years Mr. WHITEFOORD wrote many essays, poems, and epigrams, most of which he sent to the Printer of the Public Advertiser, Mr. H. S. Woodfall, for whom he had a great esteem. He much improved, if he was not the original inventor, of Cross-readings—Ship News Extraordinary—Errors of the Press—Female Administration, &c. &c. under the signature of *Papyrius Cursor*;—several of which pieces are collected in Debrett's Foundling Hospital for Wit.

His political bias never interfered with his literary friendships, and it was truly observed by Dr. Adam Smith, that although the Junto of Wits and Authors hated one another heartily, they had all a sincere regard for Mr. WHITE-

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FOORD, who by his conciliatory manners and happy adaptation of circumstances, kept his circle together in amity and good humour.

Mr. WHITEFOORD died, after a short illness, in February, 1810, in the 77th year of his age.

This hasty sketch cannot be better closed, than by the characteristic Epitaph, designed for him in the supplementary lines to the fourth and subsequent editions of Dr. Goldsmith's poem, called Retaliation.

Here WHITEFOORD reclines, and deny it who can,
Tho' he merrily lived, he is now a *grave* man!
Rare compound of oddity, frolic and fun,
Who relish'd a joke, and rejoic'd in a pun;
Whose temper was gen'rous, open, sincere,
A stranger to flattery, a stranger to fear;
Who scatter'd around wit and humour at will,
Whose daily *bons mots* half a column might fill.
A Scotchman from pride and from prejudice free,
A Scholar, yet surely no pedant was he.
What pity, alas! that so lib'ral a mind
Should so long be to Newspaper Essays confined;
Who perhaps to the summit of science might soar,
Yet content if the table he set on a roar;
Whose talents to fill any station were fit,
Yet happy if Woodfall confess'd him a Wit.

Ye

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Ye Newspaper witlings, ye pert scribb'ling folks,
Who copied his squibs, and re-echoed his jokes.
Ye tame imitators, ye servile herd, come,
Still follow your Master and visit his tomb;
To deck it bring with you festoons of the vine,
And copious libations bestow on his shrine;
Then strew all around it (you can do no less)
Cross readings, Ship News, and Mistakes of the Press.
Merry WHITEFOORD farewell, for thy sake I admit
That a Scot may have humour, I'd almost said wit;
This debt to thy memory I cannot refuse,
Thou best humour'd man, with the worst humour'd muse.

WE shall now proceed to notice, in our usual manner, the contents of the present Volume, commencing with that very important class, Agriculture, which has ever occupied the first place in the annals of the Society.

The great exertions made by Dr. A. Bain, in forming Plantations at Heffleton, in Dorsetshire, cannot fail to afford very great satisfaction to every observer of them; the plantations for which he was rewarded a few years ago by the Society, are in a most flourishing state. The beauty and luxuriance of his Pinasters, appear to bid defiance to the stormy winds to which his estate is exposed from the sea; and shew the propriety of planting this valuable timber tree,

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not only on account of its own merit, but also as a barrier and protection to other timber-trees, which flourish behind its cover.

Few plantations in the kingdom exhibit so much taste and judgement in their formation, and it is perhaps impossible that land of so poor a quality could be more usefully and advantageously employed. His late plantations, rewarded the present year, we believe include the whole of the waste land in his possession on that estate. It would be of great service to the Public, if the comparative growths of trees were more generally stated to the Society, in the manner noted in Dr. Bain's communication.

The late H. Andrews, Esq. of Wakefield, being very anxious to obtain one of the Society's honorary Rewards, the Gold Medal was adjudged to him for his plantations of Oaks, which he had judiciously introduced amongst his extensive plantations. Death snatched the honour from him at the moment it was within his grasp, but the Society liberally directed their Gold Medal to be presented to his daughters.

The great value of Larch Trees as timber, is too well known to require any illustration, and we have the satisfaction to state, that since January 1808, 684,560 Larches have been planted by William Congreve, Esq. for which he

has

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has received the Gold Medal, being the second Reward for Plantations conferred upon him by the Society.

Though fortune has not enabled Mr. Henry Cowlishaw to form plantations to an equal extent with men of greater opulence, his plantation of 75,000 Larches affords an example of exertion and industry too great to be overlooked by the Society.

The draining of wet land, the conveyance of water under ground, the improvement of durability in buildings, and preventing the waste of bricks, have engaged the attention of John Stephens, Esq. of Reading, who by a very cheap plan, hath contributed much to the purposes above-mentioned.

In our variable climate, great mischief frequently arises from bad and rainy weather at the time of harvest, and the Society have taken considerable pains to produce to the public, some mode by which such losses could be obviated. A very simple and ingenious contrivance, invented by William Jones, Esq. secures the sheaves of corn from injury when obliged to be cut in wet weather, and prevented considerable injury which he must otherwise have inevitably sustained, both in his corn and other crops.

To

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To Mr. Charles Waistell the Public are much indebted for many valuable papers in the Transactions of the Society, on the growth of timber, its value at different distant periods, &c.; the ingenious instrument he has now produced for the purpose of dibbling acorns, is well calculated for that useful purpose.

The culture and preparation of Hemp in England has been hitherto confined within so very narrow a compass, that it became desirable that the process should be more generally known. The communication of H. B. Way, Esq. of Bridport Harbour, will doubtless contribute to this effect, and to render us more independent of foreign powers for an article so essentially necessary for our Navy. The remarks which this gentleman has also furnished on the culture of Sea-cale, will prove that this excellent vegetable, which has only been considered frequently as an article of luxury, does not require the expence hitherto laid out on its culture, but may be advantageously cultivated on land applicable to few other purposes, and is even spontaneously produced on the sea cliffs.

In the class of Chemistry, H. B. Way, Esq. has shewn the advantages arising from attention and experiment, in opposition to vulgar prejudice; it had been supposed that sea sand was in no place applicable to any advantageous mixture with lime for plaster, but the exposure of a Stucco of this nature

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nature for nearly seven years, close to the sea at Bridport Harbour, in a situation open in the greatest degree to sea-winds and storms, is a fact which must satisfactorily prove to any observer, that a plaster composed of these materials is capable of being safely applied on the exterior of buildings, and to shew no signs of damp on the papers or walls within.

An extensive list of the Rewards bestowed by the Society with a view to the Encouragement of the Polite Arts, is shewn at page 23 of the present volume, describing the names and addresses of the claimants, and the particular subjects for which the Premiums and Bounties have been given this Session.

Under the Class of Manufactures, Mr. Edward Smith, of Brentwood, will be found to have extended his unremitting endeavours for the service of the Poor, and for rendering useful a vegetable hitherto looked upon as a noxious weed. The fibres which he has sent as specimens produced from the nettle, are not inferior in quality, in any respect, to those of the best hemp and flax.

The Tartan or Plaid Hose, which are in high estimation in North Britain, have hitherto been tedious and expensive to weave; Mr. J. Robertson has contrived an apparatus, by which not only this business can be better effected, but improvements

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provements will arise from it in the manufacture of other articles.

Inventions and improvements in the various branches of Mechanics, have ever been particularly considered by the Society, and their endeavours have generally been, annually, attended with great advantages to the Public.

The loss of the great and gallant Lord Nelson, and of other naval officers, who have fallen sacrifices to the marksmen stationed in the tops of the enemy's ships, suggested to Captain Bagnold, R. M. the necessity of preventing such mischief; to obviate which, he has invented a gun and carriage, which admits of a proper elevation, and accurate aim, to be taken at the object, and by a discharge of 144 musket balls at every fire, to clear away the men in the enemy's rigging in close action.

The ingenious pump invented by Mr. William Brunton, will much facilitate the sinking of mines, and prevent many of the accidents to which the pumps heretofore employed for such purpose are liable.

The great advantages of taking accurate observations at sea, have been well considered by Mr. J. Allan, who was honored the former Session with a Gold Medal for his

improvements

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improvements in a Mathematical Dividing Engine. During the last session he has produced an Improved Reflecting Circle for nautical purposes, by which observations can be taken at sea with more facility and accuracy than heretofore, with an instrument not more expensive than the one in common use.

Mr. John Hodgson has invented a very simple mode of ascertaining the Variations in the Mariner's Compass, without having recourse to the minute and tedious calculations formerly necessary, and which instrument is also particularly useful in land surveying.

Henry Earle, Esq. has taken considerable pains in the construction of a bed, by the use of which, persons whose limbs have been dangerously fractured, or whose particular diseases will not allow them to be moved, without great danger of their lives, may enjoy the advantages of frequent changes of linen, and other comforts, which in common beds could not be obtained.

To prevent pain in the necessary operations of surgery is a very desirable object, and much of the pain experienced in the common modes of Scarification and cupping, is obviated by a Scarificator lately invented by Mr. Fuller, which executes the business with greater certainty and effect.

Improvements

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Improvements in the art of clock and watch making, have been the source of great advantages to the mechanic arts. The Remontoire Escapement lately invented by Mr. George Prior, for pendulum clocks, will be much admired for the accuracy of its motion, performed with little or no friction.

The deleterious effects of mercurial vapours, when inhaled, during the operation of gilding metals, and on various other occasions, will be avoided by the use of a Mask invented by Mr. Richard Bridgen, which enables the operator to breathe fresh air without danger of the noxious fume before him. This machine is coming into very general use in the trade.

The method of pointing needles in the common way, has been represented to the Society as so dangerous, that the persons concerned in it seldom live more than eight or ten years, owing to consumptive complaints brought on by inspiring the small particles of iron and stone separated in grinding them. Mr. Thomas Wood has invented an expedient for executing this business in such a manner, as to obviate great part of this mischief, by the particles of stone and iron being caught and retained by wet cloths.

The great inconvenience arising from the Steam of Boilers

in

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in wash-houses, brew-houses, and even in private families, has been very generally complained of; the contrivance of a Steam Chimney, by Mr. G. Webster, which prevents this evil, is simple, and presents several advantages.

The improvements made by Mr. John Prior, in the Striking part of a Clock evince great ingenuity, and the motions are performed with much ease and simplicity.

In the class of Colonies and Trade, it will be observed that the Society has continued its endeavours for promoting the methods of preparing British White Herrings, equal to the Dutch. Holland acquired the greatest part of her wealth from her fisheries; many hundreds of vessels have usually sailed from her ports to take and carry away fish which Providence had bountifully brought to our coasts. The herring fishery was regarded as the brightest and most valuable gem which Holland possessed, and the endeavours of this Society have been long directed to assist in placing it in the British Crown.

Great merit attaches to Mr. Francis Fortune, and Mr. Peter Sleavin, for preparing and producing to the Society excellent white herrings, the one from the German Ocean, the other from the Irish Sea.

The

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The processes employed by each of them, will be found minutely detailed, and the herrings prepared by both modes were acknowledged by several Dutch Merchants, to be of the first quality.

We have reason to expect that Mr. Fortune will proceed on a very extensive scale with that plan which he has so spiritedly begun.

The Society have received some valuable Communications from several of our Colonies abroad, which will be noticed in a future Volume.

In order that the Plates of the present Volume might be engraved in the very best manner, the Society have been induced to be at a greater expense for their execution than those of the same size in any former Volume.

For the information of the Members, a new edition of the Rules and Orders of the Society are added to the present Volume, that such alterations as have been made within the last five years may be more generally known.

The Society take this opportunity of making acknowledgements for the Presents they have lately received, and which will be found recorded in this Volume.

Their

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Their Library has received a valuable addition of Books from Donations and purchase.

THE necessity of placing the REPOSITORY of the Society's MODELS in a condition that would be creditable to themselves and more useful to the public, had been long impressed upon the minds of the Members, but the expense attending such an undertaking being very considerable, and likely to encroach too much on the funds of the Society, the matter remained suspended for some time, till the patriotic spirit of John Christian Curwen, Esq. suggested the propriety of a subscription in aid of the sum voted by the Society out of its general fund, and induced him, with his usual liberality, to contribute Five Guineas for the express purpose of the Improvement of the Repository, and to recommend the measure to be generally adopted by such individual Members as concurred with him in opinion on the advantages which would result from a better disposition of the Models.

His example was soon followed by many Members of the Society, amongst whom the Earl of Radnor, whose noble family hath ever been distinguished for an early, generous, and unremitted attention to the interest of the Society, presented Ten Pounds. The names of the Gentlemen who

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have at present subscribed are annexed. Subscriptions continue to be received by the Housekeeper, and Mr. Robert Elwin the Collector; and it may be confidently pronounced, that on the completion of the plan, no other part of Europe will be able to display so valuable and unique a Collection of Models; the gratuitous exhibition of which will be not only highly creditable to the Society, but an honor to the Nation, and of the utmost practical benefit to Agriculturists and Mechanics, by presenting to them, concentrated in one focus, the progress and result of human ingenuity, during upwards of half a century.

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Edward Matthews, Esq.	0	10	6
Robert Twycross, Esq.	0	10	6
C. A. Busby, Esq.	20	0	0
J. K. Hedges, Esq. Six Plates of Plate Glass			

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The sum of Twenty Pounds, presented by Mr. Busby, arose from his professional charge to the Society as Architect, for the direction of the improvements in the Model Room, which he handsomely returned towards completing the object. The Plate Glass presented by Mr. Hedges is very valuable, and makes the new doors to the Model Room to correspond in appearance with those in the Society's Great Room. They contribute both to give light to the Hall of the Society, and afford a view of the Model Room from the principal entrance of the House.

It is with great pleasure that we announce the flourishing state of the Society, the valuable additions of Models and Machines in the Repository, and of Books in the Library; probably no other Society with equal funds offers such extensive opportunities of patronage and knowledge to the Members, and of substantial advantages to the Public.

The Society desire it to be clearly understood, that as a body they are not responsible for any opinion or representation of facts contained in the following pages. They have endeavoured only to compress, into a form more concise, such accounts as appeared to them too diffuse when received.

Adelphi, London,
Feb. 29, 1812.

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PREMIUMS

OFFERED IN THE YEAR 1811.

BY THE SOCIETY

INSTITUTED FOR THE ENCOURAGEMENT

OF

ARTS, MANUFACTURES, AND COMMERCE,

IN THE ADELPHI, LONDON.

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The Meetings of the Society are held at their House in the Adelphi, London; and the Consideration of the Claims, offered in the present List, will take place during the Session of the Society, commencing on the 22d of October, 1811.

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PREMIUMS offered in 1811, *by the* SOCIETY *instituted at* London, *A. D.* 1754, *for the Encouragement of Arts, Manufactures, and Commerce, with a List of the present Officers.*

PRESIDENT.

Charles, Duke of Norfolk, F. R. and A. S.

VICE-PRESIDENTS.

John Duke of Bedford, F. A. S.
Hugh, Duke of Northumberland, F. R. and A. S.
G. G. L. Marquis of Stafford, K. G.
Jacob, Earl of Radnor, F. R. and A. S.
Robert, Earl of Liverpool, F. R. S.
Charles, Earl of Romney, F. R. S.
Hon. Robert Clifford, F. R. and A. S.
Sir William Dolben, Bart. L. L. D.
Sir Robert Peel, Bart. M. P.
Sir Watkin Lewes, Knt.
Thomas Pitt, Esq. F. A. S.
Richard Clark, Esq. Chamberlain, F. A. S.
Nathaniel Conant, Esq.
Richard Powell, M. D.
John Christian Curwen, Esq. M. P.
Richard Wilson, Esq. F. A. S.

CHAIRMEN OF COMMITTEES.

Accounts.

William Lumley, Esq.
Abraham Osorio, Esq.

Correspondence and Papers.

William Tooke, Esq.
Edward Bancroft, M. D. F. R. S.

Polite Arts.

J. T. Barber, Esq. F. A. S.
Charles Lambert, Esq. F. A. S.

Agriculture.

Matthias Deane, Esq.
T. H. Andrew, Esq.

Manufactures.

J. Pearsall, Esq.
J. Trelawney, Esq.

Mechanics.

J. Kenworthey Cooke, Esq.
Thomas Gill, Esq.

Chemistry.

Henry Coxwell, Esq.
G. D. Midgley, Esq.

Colonies and Trade.

William Lewis, Esq. F. L. S.
William Vaughan, Esq.

Miscellaneous Matters.

William Kirkby, Esq.
Daniel Beaumont, Esq.

SECRETARY, Charles Taylor, M. D.
ASSISTANT SECRETARY, Mr. Thomas Woodfall.
HOUSEKEEPER, Miss A. B. Cockings.
COLLECTOR, Mr. Robert Elwin.

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ADVERTISEMENT TO THE PUBLIC.

THE chief objects of the SOCIETY are to promote the Arts, Manufactures, and Commerce of this Kingdom, by giving honorary or pecuniary Rewards, as seem to them best adapted to the case, for all such useful Inventions, Discoveries, and Improvements, (though not mentioned in this book) as tend to that purpose; and, in pursuance of this plan, the Society have already expended above FIFTY THOUSAND POUNDS, advanced by voluntary subscriptions of their members, and legacies bequeathed.

The Register of the Premiums and Bounties they have given, which may be seen at the SOCIETY's house in the *Adelphi*, will show the very great advantages which the Public have derived from this Institution.

The meetings of the SOCIETY are held every *Wednesday*, at seven o'clock in the evening, from the fourth *Wednesday* in *October* to the first *Wednesday* in *June*. The several Committees meet on other evenings in the week during the session, as particularly mentioned in their printed book of Rules and Orders.

In order still farther to promote the laudable Views of the SOCIETY, it may be necessary to explain the mode by which members are elected.

Each member has the privilege, at the meetings of the SOCIETY, or by letter to the Secretary, to propose any person who is desirous to become a member, provided the proposal contains the name, with the full addition, and place of abode, of the proposed member, and is signed by three members of the SOCIETY.

Peers of the Realm or Lords of Parliament are, on their being proposed, immediately balloted for; the names of other persons proposed to become Members are to be delivered to the Secretary, read at the next meeting of the SOCIETY, and then inserted in lists which are hung up in the Society's room: they are balloted for at the second following ordinary meeting. In both cases, if two-thirds of the members then voting ballot in their favour, they are deemed perpetual members upon payment of not less than Twenty Guineas in one sum, or subscribing members upon payment of any sum not less than Two Guineas annually.

All members are entitled to vote and assist in all the business of the SOCIETY, and the several Committees. The members have also the privilege of recommending two persons as auditors at the meetings of the SOCIETY, and by addressing a note to the housekeeper, of introducing their friends to examine the various Models, Machines, and Productions, in different branches of Arts, Manufactures, and Commerce, for which rewards have been bestowed; also to inspect the magnificent series of moral and historical Paintings, executed by the late J. BARRY, Esq. which, with some valuable Busts, Statues, &c. decorate the Great Room.

Members have the use of the Society's Library, which is valuable and annually increasing, from donations of scientific and useful books and engravings. The SOCIETY are highly sensible of the great importance of such acquisitions, and are happy to record them, with the names of the donors, in the Volume annually published of the SOCIETY's Transactions, to which the members are entitled.

Ladies are eligible, as members of the SOCIETY, to all the Privileges thereof, and are alone entitled to vote by proxy at elections, through the medium of any gentleman who is a member, on his producing a written authority for the same.

The time appointed for admission to the Paintings or Models, is from ten to two o'clock, Sundays and Wednesdays excepted.

ORDERED, SOCIETY'S HOUSE, ADELPHI, JUNE 1st, 1811.

That the several Candidates and Claimants, to whom the Society shall adjudge Premiums or Bounties, do attend at the Society's House, in the Adelphi, on the last Tuesday, in May, 1812, at Eleven o' Clock in the Morning precisely, to receive the same; that Day being appointed by the Society for the Distribution of their Rewards: And before that time no Premium or Bounty will be delivered, except to those who are about to leave the Kingdom.

In cases where the Society may think fit to admit excuses for not attending in person, deputies may be substituted to receive the Rewards, provided such Deputies are either Members of the Society, or superior Officers thereof.

PREMIUMS IN AGRICULTURE.

The candidates for planting all kinds of trees are to mention the nature of the soil, to produce certificates that the respective plantations are properly fenced and secured, and particularly to state the condition of the plants at the time of signing such certificates. Any information which the candidates for the following premiums may choose to communicate, relative to the methods made use of in forming the plantations, or promoting the growth of the several trees, or any other observations that may have occurred on the subject, will be thankfully received.

It is the intention of the Society, that such lands only as are not calculated for the purposes of Husbandry, should be employed for the purposes specified in these advertisements relative to plantations.

Article 1. Acorns.

FOR having set between the first of October, 1809, and the first of April, 1810, the greatest quantity of land, not less than ten acres, with acorns, with or without seeds, cuttings, or plants of other trees, at the option of the candidate; and for effectually fencing and preserving the same, in order to raise timber; the gold medal.

2. For the second greatest quantity of land, not less than five acres, set agreeably to the above conditions; the silver medal.

Certificates of setting agreeably to the above conditions, and that there are not fewer than three hundred young oaks on each acre, to be delivered to the Society on or before the first Tuesday in December, 1811.

3. Raising Oaks. To the person who shall have raised, since the year 1807, the greatest number of oaks, not fewer than five thousand, either from young plants or acorns, in order to secure a succession of oak timber in this kingdom; the gold medal.

4. For the next greatest number, not fewer than three thousand; the silver medal.

Certificates that there were on the land, at least the number of young oak trees required, in a thriving condition, two years after the planting, with an account of the methods pursued in making and managing the plantation, to be produced to the Society on or before the first Tuesday in January, 1812.

5. Ascertaining the best Method of raising Oaks. To the person who shall ascertain in the best manner, by actual experiments, the comparative merits of the different modes of raising oaks for timber, either from acorns set on land properly dug or tilled, from acorns set by the spade or dibble, without digging or tillage, either on a smooth surface, or among bushes, fern, or other cover; or from young plants previously raised in nurseries, and transplanted; regard being had to the expense, growth, and other respective advantages of the several methods; the gold medal.

The *accounts* and proper *certificates*, that not less than one acre has been cultivated in each mode, to be produced to the Society on or before the first Tuesday in November, 1811.

6. Chesnuts. For having sown or set, between the first of October, 1809, and the first of April, 1810, the greatest quantity of land, not less than six acres, with Spanish chesnuts, with or without seeds, cuttings, or plants of other trees, adapted to such soil, at the option of the candidate; and for effectually fencing and preserving the same, in order to raise timber; the gold medal.

7. For the second greatest quantity, not less than four acres; the silver medal.

Certificates of sowing or setting, agreeably to the above conditions, and that there are not fewer than three hundred chesnut plants in a thriving state, on each acre, to be delivered to the Society on or before the first Tuesday in January, 1812.

8. Elm. For having planted the greatest number of the English elm, not less than eight thousand, between the twenty-fourth of June, 1809, and the twenty-fourth of June, 1810; and for having effectually fenced and preserved the same in order to raise timber: the gold medal.

9. For the second greatest number, not less than five thousand; the silver medal.

Certificates of having planted agreeably to the above conditions, that the plants were in a healthy and thriving state two years at least after making the plantation, and specifying the distance of the plants, to be delivered to the Society on or before the first Tuesday in April, 1812.

10. Larch. For having planted out, between the twenty-fourth of June, 1808, and the twenty-fourth of June, 1809, the greatest number of larch trees, not fewer than five thousand, and for having effectually fenced and preserved the same in order to raise timber; the gold medal.

11. For the next greatest number, not fewer than three thousand; the silver medal.

Certificates of the number of plants, that they were in a healthy and thriving state two years at least after they were planted out, with a general account of the methods used in making the plantation, to be delivered to the Society on or before the last Tuesday in December, 1811.

N. B. The larch trees may be planted, either mixed with other trees, or by themselves, as may best suit the convenience of the planter.

12. Ash. For having sown or set, in the year 1807, the greatest quantity of land, not less than six acres, with ash for timber, with or without seed, cuttings, or plants, of such other trees as are adapted to the soil; the gold medal.

13. For the next greatest quantity, not less than four acres; the silver medal.

Certificates of the sowing or setting, agreeably to the above conditions, that there are not fewer than six hundred ash plants on each acre, in a thriving and healthy

condition, two years at least after the sowing or setting, with a general account of the methods used in making the plantation, to be delivered to the Society on or before the last Tuesday in December, 1811.

14. Forest trees. To the person who shall have enclosed and planted, or set, the greatest number of acres (not less than ten) of land, that is incapable of being ploughed, such as the borders of rivers, the sides of precipices, and any land that has too many rocks, or that is not calculated to repay the expense of tillage, owing to the surface being too hilly, mountainous, or otherwise unfit for tillage, with the best sorts of forest trees, namely, oak, Spanish chesnuts, ash, elm, beech, alder, willow, larch, spruce, and silver fir, with or without screens of Scotch fir, adapted to the soil, and intended for timber trees, between the first of October, 1808, and the first of April, 1809; the gold medal.

15. For the second greatest quantity of land, not less than seven acres; the silver medal.

A particular *account* of the methods used in making and managing the plantations, the nature of the soil, the probable number of each sort of plants, together with proper *certificates* that they were in a healthy and thriving state two years at least after making the plantation, to be delivered to the Society on or before the first Tuesday in December, 1811.

N. B. With the above forest trees, the seeds, cuttings, or plants, of such other trees as are adapted to the soil, and proper for underwood, may or may not be intermixed.

16. Norway Fir Seedlings. To the person who shall have planted in the united kingdom, during the year 1811, the greatest number, not less than two thousand, of red wood and white wood, Norway fir seedlings, at sufficient distances from each other, to stand for timber trees; the gold medal.

Certificates of the number of plants, that they were in a thriving state two years at least, after they were planted out, with a general account of the method used in making the plantation, to be delivered to the Society, on or before the first Tuesday in December, 1814.

N. B. It is recommended to plant the seedlings of about three or four years growth, and in a moderately good soil, somewhat sheltered; the wood from the district of Christiania is esteemed the best for carpenters and joiners use; and for spars and masts the trees near to Long Sound, are most valued.

17. Walnut Trees. For having planted the greatest number of walnut trees, not less than five hundred, between the 24th of June, 1809, and the 24th of June, 1810, and for having effectually fenced and preserved the same, in order to raise timber; the gold medal.

18. For the next greatest number, not fewer than three hundred; the silver medal.

Certificates of having planted agreeably to the above conditions, and that the plants were in a healthy and thriving state, two years at least after making the plantations, and specifying the distance of the plants from each other, to be delivered to the Society, on or before the first Tuesday in April, 1812.

19. Securing Plantations of Timber Trees; and Hedge Rows. To the person who shall give to the Society the most satisfactory account, founded on experience, of the most effectual and least expensive method of securing young plantations of timber trees, and hedge rows, from hares and rabbits, as well as sheep and large cattle, which at the same time shall be least subject to the depredations of wood-stealers; the silver medal.

The *accounts*, and *certificates* of the efficacy of the method, to be produced to the Society on or before the first Tuesday in December, 1811.

20. Comparative Culture of Wheat, broad-cast, drilled, and dibbled. For the best set of experiments, made on not less than twelve acres, four of which to be sown broad-cast, four drilled, and four dibbled; the two latter in equidistant rows; in order fully to ascertain which is the most advantageous mode of cultivating wheat; the gold medal.

It is required that every operation and expense of each mode of culture be fully described: and that proper *certificates* of the nature and condition of the land on which the experiments were made, together with an *account* of the produce of the corn, the weight per bushel, and also of the straw, be produced to the Society on or before the first Tuesday in February, 1812.

21. Beans and Wheat. To the person who shall have dibbled or drilled between the first of December, 1810, and the first of April, 1811, the greatest quantity of land, not less than ten acres, with beans, in equidistant rows, and hoed the intervals twice or oftener, and shall have sown the same land with wheat in the autumn of the year 1810; the gold medal.

It is required that an *account* of the sort and quantity of beans, the time of dibbling or drilling, and of reaping or mowing them, the produce per acre thrashed, the expense of dibbling or drilling, hand or horse hoeing, the distance of the rows, and the quality of the soil, together with *certificates* of the number of acres, and that the land was afterwards actually sown with wheat, be produced on or before the second Tuesday in March, 1812.

22. Beans. To the person who, in the year 1810, shall discover and cultivate, either by the drill or dibbling method, on not less than five acres, a species of horse-beans or tick-beans, that will ripen their seeds before the 21st of August; the silver medal.

It is required that a particular account of the bean, the cultivation, and the expense attending it, with proper *certificates* of the

nature and condition of the land on which the experiments were made, together with an *account* of the produce, the weight per Winchester bushel, and a sample of not less than a peck, be produced to the Society on or before the first Tuesday in December, 1811. It is apprehended that if a bean should be brought into cultivation with the habits of the hotspur, or other early peas, that it would in a great measure escape the danger arising from the collier-insect, or other insects, and allow more time for the farmers to till the land for the subsequent crop of wheat. The *accounts* and *certificates* to be delivered on or before the first Tuesday in December, 1811.

23. Parsnips. To the person who in the year 1810, shall cultivate the greatest quantity of land, not less than five acres, with parsnips, for the sole purpose of feeding cattle or sheep; the gold medal.

Certificates of the quantity of land so cultivated, with a particular *account* of the nature of the soil and weight of the produce on sixteen perches, and also of the condition of the cattle or sheep fed with the parsnips, and the advantages resulting from the practice, to be produced to the Society on or before the second Tuesday in February, 1812.

24. Buck Wheat. To the person who shall cultivate the greatest quantity of land with buck wheat, not less than thirty acres; the gold medal.

It is required that the time of sowing and reaping be noticed; also a particular *account* of the species, cultivation, and expense attending it, the manner of reaping it, thrashing it, and housing the grain; with proper *certificates* of the nature and condition of the land on which the experiments were made, and the name of the crop, if any, which the same land bore the preceding year, together with an *account* of the produce, and a sample of the seed, not less than a quart, be produced to the Society on or before the second Tuesday in January, 1812.

25. For the next greatest quantity, not less than fifteen acres, on similar conditions; the silver medal.

Information respecting its application to the feeding of cattle, hogs, and poultry, and other of its uses, is also desired. It is known to be particularly serviceable in furnishing honey to bees.

26. Bees, Wax, and Honey. To the person who shall erect, previous to the first day of September, 1811, an apiary containing the greatest number of hives or boxes stocked with bees, not less than thirty; the silver medal, or twenty guineas.

27. For the next greatest number, not fewer than twenty stocks; ten guineas.

Proper *certificates* of the number of stocks, and that they have been in the possession of the claimant during the preceding summer, to be produced to the Society on or before the first Tuesday in March, 1812.

28. Raising Grass Seeds. To the person who shall raise the greatest quantity of each of any of the following named grass seeds, *viz.*—Meadow fox-tail (alopecurus pratensis), sweet-scented vernal grass (anthoxanthum odoratum), Timothy grass (phleum pratense), meadow fescue grass (festuca pratensis), smooth-stalked meadow grass (poa pratensis), rough-stalked meadow grass (poa trivialis); the silver medal.

It is required that *certificates* from persons who have viewed them in a proper state, to identify that they are one or other of the seeds above-mentioned, indicating clearly the particular species, and noticing the quantity produced of such seeds, free from weeds or mixture of other grasses, together with proper samples of the seeds, be produced to the Society on or before the first day of February, 1812.

29. Preserving Turnips. To the person who shall discover to the Society the best and cheapest method of preserving turnips perfectly sound, and in every respect fit for the purpose of supporting and fattening sheep and neat cattle during the months of February, March, and April; the gold medal.

It is required that a full and accurate *account* of the method employed, and the expense attending the process, together with *certificates* that the produce of four acres at the least have been preserved according to the method described, and applied to the feeding of sheep and neat cattle; that the whole were drawn out of the ground before the first day of February, in order to clear the greater part of it previous to its being prepared for corn, and to save the soil from being exhausted by the turnips; and also of the weight of an average sixteen perches of the crop; be produced to the Society on or before the first Tuesday in December, 1811.

30. For the next in quantity and merit, on not less than two acres; the silver medal.

31. Preserving Cabbages. To the person who shall discover to the Society the best and cheapest method of preserving drum-headed cabbages perfectly sound, and in every respect fit for the purpose of supporting and fattening sheep and neat cattle during the months of February, March, and April; the gold medal.

32. For the next in quantity and merit, on not less than two acres; the silver medal.

Conditions the same as for preserving turnips, Art. 29.—And the *accounts* to be produced on or before the first Tuesday in December, 1811.

33. Preserving Carrots, Parsnips, or Beets. To the person who shall discover to the Society the best and cheapest method of preserving carrots, parsnips, or beets, perfectly sound, and in every respect fit for the purpose of supporting horses, and fattening sheep and neat cattle, during the

months of February, March, and April; the gold medal.

Conditions the same as for preserving turnips, Art. 29.—And the *accounts* to be delivered in on or before the first Tuesday in December, 1811.

34. For the next in quantity and merit, on not less than two acres; the silver medal.

35. Preserving Potatoes. To the person who shall discover to the Society the best and cheapest method of preserving potatoes, two or more years, perfectly sound, without vegetating, and in every other respect fit for the purpose of sets and the use of the table, and consequently of supporting and fattening cattle; the gold medal, or thirty guineas.

It is required that a full and accurate *account* of the method employed, and the expense attending the process, with *certificates* that one hundred bushels at the least have been preserved according to the method described, and that one or more bushels of the same potatoes have been set, and produced a crop without any apparent diminution of their vegetative power, and also that they have been used at table, with entire satisfaction to the person who eat of them, together with a sample of one bushel, be sent to the Society on or before the first Tuesday in December, 1811.

36. For the next greatest quantity, not less than fifty bushels; the silver medal.

37. Making Meadow-Hay in wet Weather. To the person who shall discover to the Society the best and cheapest method, superior to any hitherto practised, of making meadow-hay in wet weather; the gold medal.

A full *account* of the method employed, and of the expense attending the process, with not less than fifty-six pounds of the hay; and *certificates* that at least the produce of six acres of land has been made according to the method described, and that the whole is of equal quality with the sample; to be produced on or before the first Tuesday in January, 1812.

38. Harvesting Corn in wet Weather. To the person who shall discover to the Society the best and cheapest method, superior to any hitherto practised, of harvesting corn in wet weather; the gold medal.

A full *account* of the method employed, and of the expense attending the process, with not less than two sheaves of the corn, and *certificates* that at least the produce of ten acres has been harvested according to the method described, and that the whole is of equal quality with the samples, to be produced on or before the first Tuesday in January, 1812.

39. Gaining Land from the Sea. To the person who shall produce to the Society an account, verified by actual experiment, of his having gained the greatest quantity of land from the sea, not less than fifty acres, on the coast of Great Britain and Ireland; the gold medal.

Certificates of the quantity of land, and that the experiments were begun after the first of January, 1806, to be produced to the Society on or before the last Tuesday in November, 1811.

40. The same premium is extended one year further.

Certificates to be produced on or before the last Tuesday in November, 1812.

41. Improving Land lying Waste. For the most satisfactory *account* of the best method of improving any one of the following soils, being land lying waste or uncultivated, *viz.* clay, gravel, sand, chalk, peat earth, or bog, verified by experiments on not less than fifty acres of land; the gold medal.

42. For the next greatest quantity, not less than thirty acres; the silver medal.

It is required, that the land, before such improvement, be absolutely uncultivated, and in a great measure useless, and that, in its improved state, it be enclosed, cultivated, and divided into closes.

Certificates of the number of acres, of the quality of the land so improved, with a full *account* of every operation and expense attending such improvement, the state it is in as to the proportion of grass to arable, and the average value thereof, to be produced on or before the first Tuesday in February, 1812.

43. Manures. For the most satisfactory set of experiments, to ascertain the comparative advantages of the following manures, used as top-dressings on grass and corn land, *viz.* soot, coal-ashes, wood-ashes, lime, gypsum, night-soil, or any other fit article; the gold medal.

It is required that the above experiments be made between two or more of the above-mentioned manures, and that no less than two acres of land be dressed with each manure.

An *account* of the nature of the soil, quantity, and expense of the manure and crops, with *certificates*, to be produced on or before the last Tuesday in February, 1812.

44. Raising Water for the irrigation of Land. To the person who shall discover to the Society the cheapest and most effectual method of raising water in quantities sufficient to be beneficially employed for the purpose of irrigating land, superior to, and cheaper than any other method now in use; the gold medal, or fifty guineas.

A model, on a scale of one inch to a foot, with *certificates* that a machine at large, on the same construction, has been used, specifying the quantity of water delivered in gallons per hour, and the height to which it was raised, to be produced to the Society on or before the first of March, 1812.

45. Paring Plough. To the person who shall invent and produce to the Society

a machine or plough for the purpose of paring land preparatory to burning, superior to any hitherto known, or in use for such purpose, and to be worked by not more than one man and two horses; the silver medal, or twenty-guineas.

The machine, and *certificates* that at least three acres have been pared by it in a proper manner, to be produced to the Society on or before the first of January, 1812.

46. Machine for Dibbling Wheat. To the person who shall invent a machine, superior to any hitherto known or in use, to answer the purpose of dibbling wheat, by which the holes for receiving the grain may be made at equal distances and proper depths; the silver medal and ten guineas.

The *machine*, with *certificates* that at least three acres have been dibbled by it, to be produced to the Society on or before the second Tuesday in January, 1812.

47. Machine for Reaping or Mowing Corn. For inventing a machine to answer the purpose of mowing or reaping wheat, rye, barley, oats, or beans, by which it may be done more expeditiously and cheaper than by any method now practised, provided it does not shed the corn or pulse more than the methods in common practice, and that it lays the straw in such a manner that it may be easily gathered up for binding; the gold medal.

The *machine*, with *certificates* that at least three acres have been cut by it, to be produced to the Society on or before the second Tuesday in December, 1811. Simplicity and cheapness in the construction of this and the preceding machine, will be considered as principal parts of their merit.

48. Thrashing Machine. To the person who shall invent a machine by which corn of all sorts may be thrashed more expeditiously, effectually, and at a less expense, than by any method now in use; the gold medal.

The *machine*, or a model, with proper *certificates* that such a machine has been usefully applied, that at least thirty quarters have been thrashed by it, and of the time employed in the operation, to be produced to the Society on or before the last Tuesday in February, 1812.

49. Destroying the Grub or the Cockchafer. To the person who shall discover to the Society an effectual method, verified by repeated and satisfactory trials, of destroying the grub of the cockchafer, or of preventing or checking the destructive effects which always attend corn, peas, beans, and turnips, when attacked by those insects; the gold medal.

The *accounts*, with proper *certificates*, to be produced on or before the first Tuesday in January, 1812.

50. Destroying Worms. To the person who shall discover to the Society an effectual method, verified by repeated and satisfactory trials, of destoying worms, or of preventing the destructive effects they occasion on corn, beans, peas, or other pulse; the silver medal.

The *accounts*, with proper *certificates*, to be produced to the Society on or before the first Tuesday in January, 1812.

51. Destroying the Fly on Hops. To the person who shall discover to the Society an easy and efficacious method of destroying the fly on hops, superior to any hitherto known or practised, on not less than four acres of hop ground; the gold medal.

Accounts and *certificates* to be delivered to the Society on or before the first Tuesday in February, 1812.

52. Preventing the Blight, or Ravages of Insects, on Fruit Trees and Culinary Plants. To the person who shall discover to the Society the most effectual method of preventing the blight or ravages of insects on fruit-trees and culinary plants, superior to any hitherto known or practised, and verified by actual and comparative experiments; the silver medal.

The *accounts*, with proper *certificates*, to be delivered to the Society on or before the second Tuesday in December, 1811.

53. Cure of the Rot in Sheep. To the person who shall discover to the Society the best and most effectual method of curing the rot in sheep, verified by repeated and satisfactory experiments; the gold medal.

It is expected that the candidates furnish accurate *accounts* of the symptoms and cure of the disease, together with the imputed cause thereof, and the actual or probable means of prevention, which, with proper *certificates*, must be delivered to the Society on or before the first Tuesday in February, 1812.

54. Cure of the Foot-Rot in Sheep. To the person who shall discover to the Society the best and most effectual method of curing the foot-rot in sheep; the silver medal.

It is required that the cure be ascertained by repeated and satisfactory experiments, and the method of performing it be verified by proper *certificates* delivered to the Society on or before the first Tuesday in February, 1812.

55. Preventing the ill Effects of Flies on Sheep. To the person who shall discover to the Society the most effectual method of protecting sheep from being disturbed and injured by flies; the silver medal.

It is required that the method be ascertained by repeated experiments, and that a *certificate* of its efficacy be delivered to the Society on or before the first Tuesday in December, 1811.

56. Protecting Sheep. To the person who, in the year 1810, shall protect the greatest number of sheep, not fewer than one hundred, by hovels, sheds, or any other means, and give the most satisfactory ac-

count, verified by experiment, of the advantages arising from the practice of protecting sheep from the inclemency of the weather, by hovels, sheds, or any other means; the gold medal.

A particular *account* of the experiments made, with the advantages arising therefrom, together with the expense, and *certificates* of its utility, to be produced to the Society on or before the first Tuesday in March, 1812.

N. B. It is required that the *certificates* shall specify the length of time the sheep were so protected, and the manner in which they were maintained during that time; together with the general method of managing them.

57. Culture of Hemp. The Society wishing to encourage the growth of hemp for the use of the navy in every part of the united Empire, offer to the person who shall sow with hemp, in drills at least eighteen inches asunder, the greatest quantity of land in any part of the united Empire, not less than fifty acres statute measure, in the year 1811, and shall at the proper season cause to be plucked the summer hemp, (or male hemp bearing no seed) and continue the winter hemp (or female hemp bearing seed) on the ground until the seed is ripe; the gold medal.

58. To the person who shall sow with hemp, in drills at least eighteen inches asunder, the next greatest quantity of land in any part of the united Empire, not less than twenty-five acres, statute measure, in the year 1811, and shall at the proper season cause the same to be plucked as abovementioned; the silver medal.

Certificates of the number of acres, of the distance of the drills, of the plucking of the hemp, with a general *account* of the soil, cultivation, and produce, to be delivered to the Society, along with fourteen pounds of the hemp and two quarts of the seed, on or before the second Tuesday in January, 1812.

59. Feeding of Cattle. For the best experiments on stall feeding of cattle (not less than five head) to be continued for the space of twelve months, in order to prove the earliest maturity and greatest propensity to fatten, of the most approved breeds of cattle in Great Britain, specifying the nature of the food given, together with the daily consumption of each beast, with its weekly increase in weight, and such other observations as may be deemed of consequence; the gold medal.

A full *account* of the methods employed, and of the expenses attending the same, and *certificates* of the sundry matters stated, to be produced on or before he second Tuesday in January, 1812.

PREMIUMS FOR DISCOVERIES AND IMPROVEMENTS IN CHEMISTRY, DYEING, AND MINERALOGY.

60. Preserving Seeds of Vegetables. For the best method of preserving the Seeds of plants in a state fit for vegetation a longer time than has hitherto been practised, such method being superior to any known to the public, and verified by sufficient trial, to be communicated to the Society on or before the first Tuesday in December, 1811; the gold medal, or thirty guineas.

61. Preventing the Dry-Rot in Timber. To the person who shall discover to the Society the cause of the dry-rot in timber, and disclose a certain method of prevention superior to any hitherto known; the gold medal, or thirty guineas.

The *accounts* of the cause, and method of prevention, confirmed by repeated experiments, to be produced to the Society on or before the second Tuesday in Dec. 1811.

62. Preserving salted Provisions from becoming rancid or rusty. To the person who shall discover to the Society the best, cheapest, and most efficacious method of preserving salted provisons from becoming rancid or rusty; the gold medal, or thirty guineas.

A full *description* of the method, with proper *certificates* that it has been found on repeated trials to answer the purpose intended, to be produced to the Society on or before the first Tuesday in February, 1812.

63. Refining Whale or Seal Oil. For disclosing to the Society an effectual method of purifying whale or seal oil from the glutinous matter that incrusts the wicks of lamps, and extinguishes the light though fully supplied with oil; the gold medal, or fifty guineas.

It is required that the whole of the process be fully and fairly disclosed, in order that satisfactory experiments may be made by the Society to determine the validity of the claim; and *certificates* that not less than twenty gallons have been purified according to the process delivered in, together with two gallons of the oil, in its unpurified state, and two gallons so refined, to be produced to the Society on or before the second Tuesday in February, 1812.

64. Manufacturing Tallow Candles. To the person who shall discover to the Society a method of hardening or otherwise preparing tallow, so that candles may be made of it which will burn as clear and with as small a wick as wax candles, without running, and may be afforded at a less expense than any at present made with spermaceti; the gold medal, or fifty guineas.

Certificates that 112lb. of such tallow have been made into candles, and 12lb. of the candles made thereof, to be produced to the Society on or before the Second Tuesday in January, 1812.

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65. Candles from Resin or other Substances. To the person who shall discover to the Society the best method of making candles of resin, or any other substance, fit for common use, at a price much inferior to those made of tallow only; the gold medal, or thirty guineas.

Six pounds at least of the candles so prepared, with an *account* of the process, to be delivered to the Society on or before the first Tuesday in December, 1811.

66. Method of separating Sugar in a solid Form from Treacle. To the person who shall discover to the Society the best method of separating sugar from treacle, in a solid form, at such an expense as will render it advantageous to the public; the gold medal, or fifty guineas.

A quantity of the sugar so prepared, in a solid form, not less than thirty pounds weight, with an *account* of the process, and *certificates* that not less than one hundred weight has been so prepared, to be produced to the Society on or before the first Tuesday in February, 1812.

67. Increasing Steam. To the person who shall invent and discover to the Society a method, verified by actual experiments, of increasing the quantity or force of steam, in steam-engines with less fuel than has hitherto been employed, provided that in general the whole amount of the expences in using steam-engines may be considerably lessened; the gold medal, or thirty guineas.

To be communicated to the Society on or before the first Tuesday in January, 1812.

68. Substitute for Tar. To the person who shall invent and discover to the Society the best substitute for Stockholm tar, equal in all its properties to the best of that kind; and prepared from materials the produce of the united Kingdom and its Colonies; the gold medal, or one hundred guineas. A quantity of the substitute, not less than one hundred weight, with *certificates* that at least one ton has been manufactured, and that it can be afforded at a price not exceeding that of the best foreign tar, together with an *account* of the process, to be delivered to the Society on or before the first Tuesday in March, 1812.

69. Turpentine from the Scotch Fir or Pinus Sylvestris. For the greatest quantity of turpentine, not less than two hundred weight prepared in Great Britain from that species of fir called the Scotch fir, or Pinus sylvestris, Lin.; the gold medal.

Certificates of the turpentine being prepared from such trees of British growth, together with fifty-six pounds of the turpentine, to be delivered to the Society on or before the second Tuesday in January, 1812.

70. For the next greatest quantity prepared, not less than one hundred weight, on similar conditions; the silver medal.

N. B. The Society being in possession of the method practiced for extracting turpentine from the trees whilst growing, and of samples so procured, information will be given upon the subject, on application for that purpose, at the Society's house.

71. Preparation of Tan. To the person who shall prepare, in the most concentrated form, so as to be easily portable, and at a price applicable to the purposes of manufacturers, the largest quantity, not less than one hundred weight of the principle called by the French *tannin*, which abounds in oak-bark and many other vegetable substances; the gold medal, or thirty guineas.

Certificates of the superior quality of the quantity so prepared, and a sample of not less than 28lb. to be produced to the Society on or before the last Tuesday in January, 1812.

72. Indelible Ink. To the person who shall discover to the Society a method of making a black ink proper for writing, superior to any at present known, indestructible by chemical applications, and not dearer than that which is now in common use; the silver medal, or fifteen guineas.

Certificates that not less than two gallons of such ink have been actually prepared, and found to possess the qualities above-mentioned, with a full detail of the process of making it, and two quarts of the ink to be delivered to the Society on or before the second Tuesday in January, 1812.

73. Preparation of a Red Stain for Cotton Cloth. To the person who shall communicate to the Society the cheapest and most effectual method of printing or staining cotton cloths with a red colour, by an immediate application of the colouring matter to the cloth, equally beautiful and durable with the red colours now generally procured from decoctions of madder; the gold medal, or fifty guineas.

Certificates that the above process has been advantageously used on ten pieces of calico, each twenty-one yards or upwards in length; one piece of the calico so printed, a quart of the colour in a liquid state, and a full *account* of the preparation and application to be produced to the Society on or before the second Tuesday in January, 1812.

74. Preparation of a Green Colour for printing Cotton Cloth. To the person who shall communicate to the Society the best and cheapest method of printing with a full green colour on cotton cloth, by an immediate application of the colouring matter from a wooden block to the cloth, equally beautiful and durable as the colours now formed from the complicated process of the decoction of weld on alumine, and the solutions of indigo by earths or alkaline salts; the gold medal, or fifty guineas.

Certificates and conditions as for Premium 73.

75. Rendering Muslin less Combustible. To the person who shall discover to the Society a method of rendering muslin

less combustible, to be effected by a cheaper and more effectual mode than any hitherto known; the silver medal.

Specimens of the muslin so prepared, with a full account of the process employed for the purpose, to be produced to the Society on or before the first Tuesday in February, 1812.

N. B. It is expected that the means employed shall neither injure the quality of the muslin, stain it, nor damage any print or dye with which it may be coloured.

76. White Substance for the Basis of Paint. To the person who shall produce to the Society the best substitute, superior to any hitherto known, for the basis of paint, equally proper for the purpose as the white-lead now employed; such substitute not to be of a noxious quality, and to be afforded at a price not materially higher than that of white-lead, the gold medal, or one hundred guineas.

A quantity of the substitute, not less than 50lb. weight, with an *account* of the process used in preparing it, and *certificates* that at least one hundred weight has been manufactured, to be produced to the Society on or before the first Tuesday in January, 1812.

77. Red Pigment. To the person who shall discover to the Society a full and satisfactory process for preparing a red pigment, fit for use in oil or water, equal in tone and brilliancy to the best carmines and lakes now known or in use, and perfectly durable; the gold medal, or fifty guineas.

One pound weight of such colour, and a full disclosure of its preparation, to be produced to the Society on or before the first Tuesday in February, 1812.

N. B. It is not required that the colour should resist the action of fire, or chemical applications, but remain unaltered by the common exposure to strong light, damps, and noxious vapours.

78. Ultramarine. To the person who shall prepare an artificial ultramarine, equal in colour, brilliancy, and durability, to the best prepared from lapis lazuli, and which may be afforded at a cheap rate; the gold medal, or thirty guineas.

The conditions are the same as in the preceding Premium for the red pigment.

79. Blue Pigment from Iron. To the person who shall invent, and discover to the Society, the best blue pigment from iron, superior to Antwerp or Prussian blue in colour and durability, fit for use in oil or water, which may be afforded at a cheap rate; the gold medal, or thirty guineas.

One pound weight of the colour, and a full disclosure of its preparation, to be produced to the Society on or before the first Tuesday in February, 1812.

N. B. It appears from the analysis of lapis lazuli by Klaproth, and the experiments of Guyton, (related in the Annales de Chemie) that ultramarine is a blue sulphurat of iron, and that a blue substance much resembling it is constantly found amongst the scoriæ of blast furnaces where iron is reduced. The Society by offering the above premium wish to call the attention of persons to these facts, and encourage them to make experiments, in the hope of producing a blue pigment which may be substituted for ultramarine.

80. Destructive Effects from Moths. To the person who shall discover to the Society a cheap, easy, and effectual method, verified by repeated and satisfactory trials, of preventing the destructive effects occasioned by moths and other insects, in furs, woollens, and other articles, superior to any hitherto known or practised; the silver medal, or fifteen guineas.

The *accounts*, with proper *certificates*, to be produced to the Society on or before the first Tuesday in January, 1812.

81. Statuary Marble. To the person who shall discover, within Great Britain or Ireland, a quarry of white marble fit for the purposes of statuary, and equal in all respects to those kinds now imported from Italy; the gold medal, or one hundred guineas.

A block of at least three feet in length, two in height, and two in width, with an account of the situation of the quarry, and *certificates* of its possessing considerable extent, to be produced to the Society on or before the first Tuesday in February, 1812.

N. B. In order to prevent useless expense or trouble to the claimant in forwarding so large a block, the Society will be ready to examine any smaller specimen of the marble, and express their opinion of its value to the candidate before the block required by the above premium is produced.

82. Preparation of Sulphuric Acid, from Sulphur without the Use of any Nitric Salt. To the person who shall prepare the largest quantity (not less than one ton) of sulphuric acid from sulphur without any nitric salt, of a specific gravity not inferior to the best sulphuric acid of commerce; the gold medal, or fifty guineas.

Certificates that not less than the above quantity of such an acid has been prepared, together with a sample, to be produced to the Society on or before the first Tuesday in January, 1812.

83. Preparation of any Alkaline or Earthen Nitrate. To the person who shall prepare, in Great Britain, the largest quantity, not less than one hundred weight, of any salt of nitric acid, with either earths or alkalis, by a method superior to, and as cheap as those hitherto practised; the gold medal, or one hundred guineas.

Certificates of the above quantity having been prepared, and a sample of not less than 28lb. to be produced to the Society on or before the last Tuesday in January, 1812.

84. Fine Bar Iron. To the person, in Great Britain, who shall make the greatest quantity of bar-iron, not less than ten tons

with coak, from coak pigs, equal in quality to the best iron imported from Sweden or Russia, and as fit for being converted into steel; the gold medal, or fifty guineas.

Samples, not less than one hundred weight, with *certificates* that the whole quantity is of equal quality, to be produced to the Society on or before the first Tuesday in January, 1812.

85. Preserving Iron from Rust. To the person who shall invent and discover to the Society a cheap composition, superior to any now in use, which shall effectually preserve wrought iron from rust; the gold medal, or fifty guineas.

A full description of the method of preparing the composition, with *certificates* that it has stood at least two years unimpaired, being exposed to the atmosphere during the whole time, to be produced to the Society, with ten pounds weight of the composition, on or before the first Tuesday in January, 1812.

86. Refining Block Tin. To the person who shall discover to the Society the best method of purifying or refining block-tin, so as to render it fit for the finest purposes to which grain-tin is now applied, and not higher in price; the gold medal, or fifty guineas.

Certificates that not less than three tons have been so refined or purified, with a full detail of the process, and a quantity, not less than one hundred weight, of the tin so refined, to be produced to the Society on or before the first Tuesday in January, 1812.

87. Glazing Earthen-Ware without Lead. To the person who shall discover to the Society the cheapest, safest, most durable, and most easily fusible composition, fit for the purpose of glazing the ordinary kinds of earthen-ware, without any preparation of lead, and superior to any hitherto in use; the gold medal, or thirty guineas.

Specimens of the ware so glazed, with proper *certificates* of its having succeeded, and a sample of the materials made use of, to be produced to the Society on or before the first Tuesday in February, 1812.

88. Cobalt, Zaffre, and Smalt. For the discovery of a mine of cobalt in Great Britain or Ireland, that will produce a sufficient quantity of the mineral, of good quality, to supply a manufacture of Zaffre or Smalt; the gold medal, or thirty guineas.

Certificates that at least one ton of the ore has been raised; and five pounds of Zaffre, and ten pounds of Smalt made therefrom, to be produced to the Society on or before the last Tuesday in March, 1819.

N. B. It appears from the minutes of the Society, in 1755, that a discovery of Cobalt was made at or near Truro in Cornwall, but not a sufficient quantity of ore found to answer the desired purpose.

89. Refining Copper from the Ore. To the person who shall discover to the Society the best method of separating, purifying, and refining copper from the ore, so as to render it fit for the finest purposes to which fine copper is now applied, and by a process superior to any hitherto known or in use, and not higher in price; the gold medal, or fifty guineas.

Certificates that not less than three tons have been so prepared or refined, and a quantity not less than one hundred weight of the copper so refined to be produced to the Society on or before the first Tuesday in February, 1812.

90. Mineralogical Map of England and Wales. To the person who shall complete and publish an accurate mineralogical map of England and Wales, on a scale of not less than ten miles to an inch, containing an account of the situation of the different mines therein, and describing the kinds of minerals thence produced; the gold medal, or fifty guineas.

Certificates of the accuracy of such map, together with the map, to be produced to the Society on or before the first Tuesday in February, 1812. The map to remain the property of the Society.

91. Mineralogical Map of Ireland. The same premium is offered for a mineralogical map of Ireland, on similar conditions.

92. Mineralogical Map of Scotland. The same premium is offered for a mineralogical map of Scotland, on similar conditions.

93. Natural History. To the author who shall publish, in the year 1811, the natural history of any county in the united kingdom; the gold medal, or fifty guineas.

It is required that the several natural productions, animal, vegetable, and mineral, peculiar to the county, or found therein, be carefully and scientifically arranged and described, in order that the public may be enabled to judge what arts or manufactures are most likely to succeed in such county. The work to be delivered to the Society on or before the last Tuesday in January, 1812, and a copy to be the property of the Society.

PREMIUMS IN POLITE ARTS.

94. Honorary Premiums for Drawings by Nobility. For the best original drawing of any kind, by young gentlemen under the age of twenty-one, sons or grandsons of peers or peeresses in their own right, of Great Britain or Ireland; the honorary medal of the Society in gold.

95. The silver medal for the best copy.

96—97. The same premiums will be given, on the like conditions, to young ladies, daughters or grand-daughters of peers or peeresses in their own right, of Great Britain or Ireland.

98. Honorary Premiums for Drawings by Gentlemen. For the best original drawing of any kind, by young gentlemen under the age of twenty-one; the gold medal.

99. For the best copy, the silver medal.

100—101. The same premiums will be given for drawings by young ladies.

N. B. As the foregoing honorary premiums are intended only for such of the nobility and gentry as may hereafter become patrons or patronesses of the arts; persons professing any branch of the polite arts, or any business dependant on the arts of design, or the sons or daughters of such persons, will not be admitted candidates in the above classes, including 94 to 101.

102. Drawings of Outlines. For the best outline, after the plaister cast of Antinous, by persons of either sex under the age of twenty-one, the figure not less than eighteen inches; the silver medal.

103. Drawings of Landscapes. For the best drawing, in water-colours, of a landscape after nature, not less than eighteen inches by twelve, by persons of either sex, under twenty-one years of age; the silver medal.

104. Historical Drawings. For the best historical drawing, being an original composition of three or more human figures, the height of the principal figure not less than eight inches, by persons of either sex under twenty-one years of age; the gold medal.

105. For the next in merit; the silver medal.

106. Premiums for Drawings in General. For the best original drawing of any kind, by persons of either sex, under the age of twenty-one; the gold medal.

107. For the best copy, the silver medal.

108. Perspective Drawings of Machines. For the best perspective drawings of machines, by persons under twenty-one years of age; the silver medal.

109. Paintings in Oil. For the best painting in oil, of a landscape after nature, the size thirty-six by twenty-eight inches; by persons of either sex, under twenty-five years of age; the gold medal.

110. For the next in merit, the silver medal. Each candidate must mention from whence the view was taken.

111. Plaster Cast. For the best original model of a single figure, or group not exceeding three figures; the gold medallion.

112. For the next in merit; the silver medallion, on similar conditions.

N. B. Purity and simplicity are required to be attended to in the general form, as well as correctness in the several parts of the figure.

A cast from the model to remain the property of the Society.

The following inscription to be engraved on these medallions; *The Premium given by the Society for the Encouragement of Arts, Manufactures, and Commerce, in conformity to the Will of John Stock, Esq. of Hampstead.*

113. Bronzes. For the best drapery figure or group cast in bronze; if a single figure, not less than twelve inches high, and if a group, not less than nine inches; and which will require the least additional labour to repair; the gold medal, or the silver medal and twenty guineas.

The Society, sensible of the great importance of correct Drawing and free Etching, as the best and most solid ground work for the rising school of engraving, offer the following premiums for the pupils of engravers, or others who practice that art.

114. Drawings by Engravers' Pupils, &c. For the best finished drawing of the statue of the Discobolos, No. 34, in the British Museum; the size of the drawing not less than eighteen inches, by persons under twenty-one years of age; the silver medal.

115. Drawings of the Hand and Foot. For the best drawing with a reed, or common pen, of the human hand and foot, the size of life, or larger; the several parts marked with anatomical accuracy; the lesser silver medal.

116. Pen Drawing of a Head. For the best free pen drawing of the head of Homer, marked No. 33, in the British Museum, not less than twelve inches in heighth; the lesser silver medal.

N. B. Those artists who are inclined to make trial for the premiums in drawing of the Discobolos, or the head of Homer, (with permission of the trustees) at the British Museum, in the room marked X, may be informed by the Secretary, of the proper mode of applying for that permission.

117. Etching of an Historical Subject. For the best free etching in historical composition from a picture of eminence; the gold medal.

118. For the next in merit; the silver medal.

119. Etching of a Landscape. For the best free etching in landscape composition, from a picture of eminence; the silver medal.

120. Etching of a Portrait. For the best free etching of a portrait; the silver medal.

The manner of Vandyke and Rembrandt is recommended.

121. Historical Engraving. For the best finished engraving in historical composition, wherein the chiaro scuro is required to be particularly attended to; the gold medal.

122. For the next in merit; the silver medal.

123. Landscape Engraving. For the best finished engraving in landscape composition, wherein the same attention to chiaro scuro will be required; the gold medal.

124. For the next in merit; the silver medal.

125. Engraving of a Portrait. For the best finished engraving of a portrait, with equal attention to chiaro scuro; the gold medal.

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126. For the next in merit; the silver medal.

N. B. In the class of finished engravings the Society require a forward aquafortis impression, and two in progressive states of the plate; and a finished proof to be sent, and to remain with the Society.

127. Engraving on Wood Blocks. For the best engraving on wood blocks of an historical subject; the size of the principal figure not less than six inches in height, and the block to be at least twelve inches by nine; the gold medal.

Two or more impressions, with the block, to be produced to the Society. The impressions, but not the block, to remain the property of the Society.

128. For the next in merit; the silver medal, on similar conditions.

129. Medal Die Engraving. For the best die engraving of one or more heads after the engraver's own model; the gold medal.

130. For the next in merit; the silver medal.

131. For the best die engraving of one figure, or a group consisting of not more than three figures, after the engraver's own model; the gold medal.

132. For the next in merit; the silver medal.

The dies, with two impressions or casts, and the model, in each claim for medal die sinking are to be produced to the Society. The impressions or casts, but not the model or die, to remain the property of the Society.

133. Black Lead Pencils. The silver medal, or twenty guineas, is offered to the person who shall discover an effectual method of freeing black-lead from impurity, and improving its quality, for the purposes of the arts.

N. B. The object of this premium is to obtain hard or soft pencils, uniformly of a good quality.

CONDITIONS.

FOR THE POLITE ARTS.

No articles in the class of polite arts, whether for claims or bounties, are to be admitted into the Society after the first Tuesday in March, 1812.

No person who has gained the first premium in any class shall be admitted a candidate in a class of inferior age; and no candidate shall receive more than one premium in one year.

No person shall be admitted a candidate in any class, who has already obtained the first premium in that class.

No more than one performance in any class shall be received from the same candidate.

All performances (to which premiums or bounties are adjudged) shall remain with the Society until the first Wednesday in June, 1812, when they will be re-delivered, unless mentioned in the premiums to the contrary.

No performance shall be admitted, that has obtained a premium, reward, or gratification, from any other society, or academy, or been offered for that purpose.

It is required, that the matters for which premiums are offered, be delivered in without names, or any intimation to whom they belong; that each particular thing be marked in what manner each claimant thinks fit, such claimant sending with it a paper sealed up, having on the outside a corresponding mark, and on the inside the claimant's name, residence, and age; which paper is not to be opened unless the candidate be successful, or by a special vote of the Society.

To encourage real merit; and prevent attempts to impose on the Society, by producing drawings made or retouched by any other person than the candidate, the Society require a specimen of the abilities of each successful candidate, to be made under the inspection of the Committee of Polite Arts, in every instance where such proof may appear necessary.

All candidates in the Polite Arts are required to signify, on their drawings, whether the performances are originals or copies; and to mark thereon the class for which each is intended, and if possible to send the originals from whence the copies were taken.

PREMIUMS FOR ENCOURAGING AND IMPROVING MANUFACTURES.

134. Employment of Females. To the person who shall instruct and employ the greatest number of females, not fewer than twenty, in the making of mens' cloaths, particularly of woollen cloth, and not being for the use of the army or navy; the gold medal, or fifty guineas.

Certificates that the number of women above-mentioned, have been constantly so employed for at least three months, to be produced to the Society, on or before the last Tuesday in March, 1812.

135. For the next greatest number of women so employed, not fewer than ten; the silver medal, or fifteen guineas, on similar conditions.

136. Cloth from Hop-Stalks, Nettles, &c. To the person who shall produce to the Society the greatest quantity, not less than thirty yards of cloth, at least 27 inches wide, made in Great Britain or Ireland, of hop-stalks or bines, nettles, or other raw vegetable substances, the produce of Great Britain or Ireland, superior to any hitherto manufactured from such substances, and which can be generally afforded as cheap as cloth of equal quality and appearance

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now made from hemp, flax, or cotton, and much finer in quality than any hitherto manufactured in England from hop-stalks, &c.; the gold medal, or thirty guineas.

One pound of the thread of which the cloth is made, and thirty yards of the cloth, together with proper *certificates* that the whole is manufactured from hop-stalks or bines, &c. to be produced to the Society on or before the first Tuesday in December, 1811.

N. B. The Society is already in the possession of cloth made in England from hop-stalks or bines, and nettles, which may be inspected by application to the Housekeeper.

137. Sheep's Wool. To the person who shall prove to the Society that he has sold the largest quantity of Merino wool, or such wool as will answer the same purposes, being the produce of his own flock, for the purpose of being manufactured in superfine cloth, the quantity of wool not less than five hundred weight, in the year 1811; the gold medal.

Certificates, along with samples of the wool, and of cloth manufactured from it, to be produced to the Society on or before the last Tuesday in March, 1812.

138. For the next greatest quantity, not less than two hundred and fifty pounds; the silver medal on similar conditions.

139. Hog's Bristles. To the person who shall prepare the greatest quantity of bristles, from swine bred in the united kingdoms, equal in quality to those imported from Russia or Prussia, and at as cheap a rate; the silver medal, or fifteen guineas.

Certificates, that not less than one hundred weight have been so prepared, and a sample of not less than fourteen pounds of such bristles, to be produced to the Society on or before the last Tuesday in February, 1812.

140. Wicks for Candles or Lamps. To the person who shall discover to the Society a method of manufacturing hop-stalks or bines, nettles, or any other cheap material, the growth of Great Britain, so as to render them equally fit for the purpose of supplying the place of cotton, for wicks of candles or lamps; the silver medal, or twenty guineas.

Samples, not less than five pounds weight, of the wick so prepared, to be produced to the Society on or before the last Tuesday in December, 1811, with *certificates* that the whole quantity is equal in quality to the sample.

141. Experiments to ascertain the proper Thickness of Wicks for Candles. To the person who shall make known to the Society the most satisfactory result of a series of experiments, actually made by him to determine the best thickness of cotton wicks for candles, so as to obviate the defects of those commonly used; the silver medal, or ten guineas.

Certificates, that not less than one hundred weight have been so made, and six pounds of the candles, to be produced to the Society on or before the last Tuesday in February, 1812.

N. B. The intention in offering this premium, is to ascertain the proper thickness or bulk of the wick in proportion to that of the tallow, and to remove the unpleasant consequences and waste arising from the sparkling, or guttering of the candles in common use.

142. Paper from raw Vegetable Substances. To the person who shall, between the first of January, 1811, and the first of January, 1812, make the greatest quantity, and of the best quality, (not less than ten reams) of good and useful paper, from raw vegetable substances, the produce of Great Britain or Ireland, of which one hundred weight has not been used in manufacturing paper, previous to January, 1810, superior to any hitherto manufactured from such substances, and which can be generally afforded as cheap as paper of equal quality and appearance now made from rags; the silver medal, or twenty guineas.

N. B. The object of the Society being to add to the number and quantity of raw materials used in this manufacture, it is their wish to include every useful sort of paper, and to introduce such natural products as can be easily and cheaply procured in great quantities. The Society are in possession of two volumes containing a great variety of specimens of paper made from raw vegetable substances, viz. nettles, potatoe-haulm, poplar, hop-bines, &c. which volumes may be inspected by any person on application to the Housekeeper.

Certificates of the making such paper, and and one ream of the paper, to be produced on or before the second Tuesday in January, 1812.

143. Transparent Paper. To the person who shall discover to the Society a method of making paper from the pulp, that shall be perfectly transparent, and of a substance and body equal to foolscap, that shall take and bear common writing-ink, with the same facility and correctness as writing-paper generally in use; the silver medal, or twenty guineas.

Certificates of the making such paper, an *account* of the process, and one ream of the paper, to be produced on or before the second Tuesday in January, 1812.

144. Chintz Patterns for Calico-Printers. For the best original pattern in a new taste, of light and dark-ground chintz for garment-work, or furniture, fit for the purposes of calico printers, by persons of either sex; the silver medal. The pattern for which the premium is adjudged to remain the property of the Society.

145. Copper-plate Patterns for Calico-Printers. For the best pattern, in a new style, fit for the purposes of calico-

printers for garment-work, or furniture; the silver medal. The pattern for which premium is adjudged to remain the property of the Society.

N. B. The patterns to be produced on or before the last Tuesday in February, 1812.

146. Manufacture of Sail Cloth. To the person who shall produce to the Society a whole piece of sail-cloth, of his own manufacture, proper for the general use of the Royal Navy, and equal to the best Dutch; the gold medal, or forty guineas.

Certificates of its being manufactured by the person sending it, and a particular detail of the several circumstances attending its manufacture through the different stages thereof, to be sent to the Society on or before the last Tuesday in March, 1812.

147. For the next best in merit on similar conditions, the silver medal, or twenty guineas.

148. Gloves equal to French Kid. To the person who shall make known to the Society, a process equal to that of the French, or a superior one; for preparing, dyeing, and finishing the skins, verified by actual experiments, and the communication accompanied with at least a dozen pair of gloves made from skins so prepared in an equal or superior manner; the gold medal, or forty guineas.

Certificates from competent persons fully approving of the result of such experiments, together with the gloves and communication to be produced to the Society on or before the last Tuesday in March, 1812.

PREMIUMS IN MECHANICS.

149. Gunpowder Mills. To the person who, in the year 1811, shall invent and bring to perfection the most effectual method of so conducting the works of gunpowder-mills, in the business of making gunpowder, as to prevent explosion; the gold medal, or one hundred guineas.

Certificates and *accounts* of the method having been put in practice in one or more gunpowder-mills in this kingdom, and that it promises, in the opinion of the best judges concerned in such works, to answer the purpose intended, to be produced to the Society on or before the first Tuesday in February, 1812.

N. B. As an encouragement to persons to turn their thoughts to improvements of this nature, if any should be made on the present method of conducting the business of gunpowder making, which fall short of the total prevention of explosion, and they are sent to the Society for the sake of humanity, the papers so sent in will receive due consideration, and such bounty or reward will be bestowed as they may appear to merit.

150. Transit Instrument. To the person who shall invent and produce to the Society a cheap and portable transit-instrument which may easily be converted into a zenith-sector, capable of being accurately and expeditiously adjusted for the purpose of finding the latitudes and longitudes of places, and superior to any portable transit-instrument now in use; the gold medal, or forty guineas.

To be produced on or before the last Tuesday in January, 1812.

151. Taking Whales by the Gun-Harpoon. To the person who, in the year 1811, shall strike the greatest number of whales, not fewer than three, with the gun-harpoon; ten guineas.

Certificates of the striking such whales, and that they were actually taken in the year 1811, signed by the master, or by the mate, when the claim is made by the master, to be produced to the Society, on or before the last Tuesday in December, 1811.

This premium is extended one year further, on similar conditions.

152. Family Mill. To the person who shall invent and produce to the Society the best-constructed mill for grinding corn for the use of private families, or parish-poor; the construction to be such as to render the working of the mill easy and expeditious, and superior to any hitherto in use; the gold medal, or thirty guineas.

The mill, and *certificates* of its having been used to good effect, to be produced to the Society on or before the first Tuesday in February, 1812. Cheapness and simplicity will be considered as essential parts of its merit; and the mill or a model, to remain with the Society.

153. Machine for raising Coals, Ore, &c. &c. To the person who shall invent a machine for raising coals, ore, &c. from mines, superior to any hitherto known or in use; and which shall produce the effect at a less expense than those already known or in use; the gold medal, or fifty guineas.

A model of the machine, made on a scale of not less than one inch to a foot, with a *certificate* that a machine at large on the same construction has been advantageously used, to be produced to the Society on or before the second Tuesday in February, 1812.

154. Improved Walking-Wheel, or Crane. To the person who shall invent an improved walking-wheel or crane, on which the weight and power of any person or persons shall be applied with the greatest safety, and effect, and so contrived that the power can be varied according to the greater or less weight to be raised or lowered; the gold medal, or thirty guineas.

The model on a scale of not less than one inch to a foot, with a proper *certificate* that the machine at large has been employed to good effect, to be produced to the Society on or before the second Tuesday in February, 1812.

155. Machine for raising Water. To the person who shall invent a machine on a better, cheaper, and more simple construction than any hitherto known or in use for raising water out of wells, &c. from a depth of not less than fifty feet; the gold medal, or thirty guineas.

Certificates of the performance of the machine, and a model of it, on a scale of not less than one inch to a foot, to be produced to the Society on or before the first Tuesday in February, 1812.

156. Elm Pipes. To the person who shall invent and discover to the Society a substitute for the elm pipes now in common use for the conveyance of water, which shall be cheaper, equally effectual, and more durable than any heretofore employed; the gold medal, or fifty guineas.

It is required that one of the pipes so employed, an accurate *account* of the method used, and every expense attending it, together with satisfactory accounts of its being effectual, to be delivered to the Society on or before the second Tuesday in January, 1812.

157. Laying Wooden Pipes. To the person who shall invent and discover to the Society a superior method of laying or connecting the wooden pipes now in use for conveying water, so as to lessen the injury they receive thereby; the silver medal, or twenty guineas.

It is required that a model, an accurate *account* of the method used, and every expense attending it, together with satisfactory *certificates* of its being effectual, be delivered to the Society on or before the second Tuesday in January, 1812.

158. Extinguishing Fires. To the person who shall produce to the Society the best and most effectual method of procuring an immediate supply of water in case of fire, or for the means best calculated to prevent or extinguish accidental fires in buildings, superior to any now in use; the gold medal, or thirty guineas.

Certificates of the method having been practised with success, with a full description thereof, to be delivered to the Society on or before the second Tuesday in January, 1812.

159. Boring and Blasting Rocks. To the person who shall discover to the Society a more simple, safe, cheap, and expeditious method than any hitherto known or in use, of boring or blasting rocks in mines, shafts, wells, &c.; the gold medal, or thirty guineas.

Certificates of the method having been practised with success, with a full description thereof, to be delivered to the Society on or before the first Tuesday in January, 1812.

160. Heating Rooms for the Purposes of Manufactures. To the person who shall invent and discover to the Society a method of heating rooms, superior to any hitherto known or in use, and at a moderate expense, for the purpose of painters, japanners, and other manufacturers, so as to avoid the necessity of iron or copper tunnels going through the rooms to convey the smoke, whereby the danger from such tunnels may be prevented; the gold medal, or forty guineas.

A model or complete drawing and description of the method, with *certificates* that it has been successfully practised, to be delivered to the Society on or before the last Tuesday in March, 1812.

161. Improved Ventilation. To the person who shall invent and produce to the Society a mode of permanently ventilating the apartments in hospitals, workhouses, and other crowded places, superior to any now known or used; the gold medal, or fifty guineas.

A model of the apparatus, and a full *account* of the means by which the effect has been produced, with proper *certificates*, to be delivered to the Society on or before the last Tuesday in February, 1812.

162. Preventing Accidents fro Horses falling with two-wheeled Carriages. To the person who shall invent and produce to the Society a method, superior to any hitherto known or in use, to prevent accidents from the falling of horses with two-wheeled carriages, especially on steep declivities; the silver medal, or fifteen guineas.

A model of the apparatus, and a full *account* of the means by which the effect has been produced, with proper *certificates* that the same has been used with success, to be delivered to the Society on or before the second Tuesday in January, 1812.

163. Improving Turnpike and other Roads. To the person who shall discover to the Society the most effectual and cheapest method, verified by actual experiments, of combining the materials ordinarily employed in making or repairing roads, so as to form them of the hardest consistency by their cementing properties, or by an artificial mixture of earth, stones, &c. altered by heat, or any other mode, so as to form an even, hard, and durable carriage-road; the gold medal, or thirty guineas.

It is required that an accurate *account* of the method used, and every expense attending it, together with satisfactory *certificates* of its being effectual, be delivered to the Society on or before the first Tuesday in March, 1812.

164. Raising the Bodies of Persons who have sunk under Water. To the person who shall invent and produce to the Society a cheap and portable drag, or other machine, superior to those now in use, for the purpose of taking up, in the best and most expeditious manner, and with the least injury, the bodies of persons who have sunk under water; the gold medal, or thirty guineas.

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The drag or machine, to answer the purpose intended, to be produced to the Society on or before the first Tuesday in March, 1812.

165. For preventing prejudicial Effects to the Persons employed in Pointing Needles To the person who shall invent and produce to the Society a mode of obviating the prejudicial effects that attend the operation of pointing needles, by grinding them dry, during which the particles of grindstone, dust, and steel, being thrown into the air, and received with it into the lungs, occasion asthma, consumption, and other painful disorders; the gold medal, or thirty guineas.

A model of the apparatus, and a full *account* of the means by which the effect has been produced, together with proper *certificates* of its practicability and adoption, to be delivered to the Society on or before the second Tuesday in March, 1812.

PREMIUMS OFFERED FOR THE ADVANTAGE OF THE COMMERCE OF THE UNITED EMPIRE.

166. Taking Porpoises. To the people in any boat or vessel, who, in the year 1811, shall take the greatest number of porpoises on the coast of Great Britain or Ireland, by gun, harpoon, or any other method, not fewer than thirty, for the purpose of extracting oil from them; the gold medal, or thirty pounds.

Certificates of the number, signed by the persons to whom they have been sold or delivered for the purpose of extracting the oil, to be produced to the Society on or before the last Tuesday in January, 1812.

167. Oil from Porpoises. To the person who shall manufacture the greatest quantity of oil from porpoises taken on the coast of Great Britain or Ireland, in the year 1810, not less than twenty tons; the gold medal, or thirty pounds.

Certificates of the oil having been made from porpoises actually caught on the coast of Great Britain or Ireland, and two gallons of the oil as a sample, to be produced to the Society on or before the last Tuesday in February, 1812.

168. Curing Herrings. To the person or persons who shall, before January, 1812, cure the greatest quantity of white herrings, not less than thirty barrels, equal in all respects to the best Dutch herrings, the same being caught in the British or Irish seas, and cured in a British or Irish vessel or port; the gold medal, or fifty guineas.

169. For the next greatest quantity, not less than fifteen barrels; the silver medal, or twenty guineas.

A sixteen gallon barrel of the herrings to be produced to the Society on or before the first Tuesday in February, 1812, with *certificates*, that the conditions of the premium have been fulfilled, and that the whole were cured in the same manner as the specimen, together with a full description of the process employed.

PREMIUMS OFFERED FOR THE ADVANTAGE OF THE BRITISH COLONIES.

170. Nutmegs. For the greatest quantity of merchantable nutmegs, not less than ten pounds weight, being the growth of his Majesty's dominions in the West Indies, or any of the British settlements on the coast of Africa, or the several islands adjacent thereto, and equal to those imported from the islands of the East Indies; the gold medal, or fifty guineas.

Satisfactory *certificates*, from the governor or commander in chief, of the place of growth, with an *account* of the number of trees, their age, nearly the quantity of fruit, on each tree, and the manner of culture, to be produced on or before the first Tuesday in January, 1812.

171. Kali for Barilla. To the person who shall have cultivated, in the Bahama islands, or any other part of his Majesty's dominions in the West Indies, or any of the British settlements on the coast of Africa, or the several islands adjacent thereto in the year 1810, the greatest quantity of land, not less than two acres, with Spanish kali fit for the purpose of making barilla; the gold medal, or thirty guineas.

172. For the next greatest quantity, not less than one acre; the silver medal, or fifteen guineas.

Certificates, signed by the governor or commander in chief for the time being, of the quantity of land so cultivated, and of the state of the plants at the time of signing such *certificates*, to be delivered to the Society, with samples of the kali, on or before the second Tuesday in January, 1812.

173. Destroying the Insect commonly called the Borer. To the person who shall discover to the Society an effectual method of destroying the insect commonly called the borer, which has of late years been so destructive to the sugar canes in the West-India islands, the British settlements on the coast of Africa, and the several islands adjacent thereto; the gold medal, or fifty guineas.

The discovery to be ascertained by satisfactory *certificates*, under the hand and seal of the governor or commander in chief for the time being, and of some other respectable persons, inhabitants of the islands, or other place, in which the remedy has been successfully applied; such *certificates* to be delivered to the Society on or before the first Tuesday in January, 1812.

174. Cultivation of Hemp in Upper Canada. To the person who shall sow with hemp, the greatest quantity of land in the province of Upper Canada, not less

than six arpents, (each four-fifths of a statute acre) in the year 1810, and shall at the proper season cause to be plucked the summer hemp, or male hemp bearing no seed, and continue the winter hemp, or female hemp bearing seed, on the ground untill the seed is ripe; the gold medal, or one hundred dollars.

175. To the person who shall sow with hemp the next greatest quantity of land in the same province of Upper Canada, not less than five arpents in the year 1810, in the manner above mentioned; the silver medal, or eighty dollars.

176. For the next greatest quantity of land, in the same province, and in a similar manner, not less than four arpents; sixty dollars.

177. For the next greatest quantity of land in the same province, and in a similar manner, not less than three arpents; forty dollars.

178. For the next greatest quantity of land in the same province, and in a similar manner, not less than one arpent; twenty dollars.

Certificates of the number of arpents, the method of culture, of the plucking of the hemp, with a general *account* whether sown broad-cast or in drills, the expense, soil, cultivation, and produce, to be transmitted to the Society, certified under the hand and seal of the governor or lieutenant-governor, together with 28 lb. of the hemp, and two quarts of the seed, on or before the last Tuesday in April, 1812.

179 to 183. In Lower Canada. Premiums exactly similar in all respects to those held out for the province of Upper Canada, are also offered to the province of Lower Canada.

184 to 188. In Nova Scotia and New Brunswic. Similar premiums in all respects are also offered to the provinces of Nova Scotia, and New Brunswic.

189. Importation of Hemp from Canada, Nova Scotia, and New Brunswic. To the master of that vessel which shall bring to this country the greatest quantity of marketable hemp, not less than one hundred tons, in the year 1811, the produce of Upper Canada, or of one of the above-mentioned provinces; the gold medal.

190. To the master of that vessel which shall bring the next quantity, not less than fifty tons; the silver medal.

Certificates satisfactory to the Society, to be produced by the master of the vessel on or before the first Tuesday in February, 1812, to testify that such hemp was grown and prepared in Canada, Nova Scotia, or New Brunswic.

191. Substitute for Hemp. To the person who, in the year 1811, shall discover and produce to the Society, a substitute for hemp, equally cheap, durable, and applicable to all the purposes for which hemp is now used; the gold medal, or fifty guineas.

A quantity of the substitute, not less than one hundred weight, together with proper *certificates* from the governor or commander in chief, if raised in any of the British colonies, or from the Secretary of the Board of Trade, if raised in the East Indies, to prove that the same has been used with success, to be produced to the Society on or before the last Tuesday in February, 1812.

N. B. The premiums for Nos. 170, *to* 191, *are all extended one year further, on similar conditions. Certificates to be produced at the same time of the year ensuing.*

192. Silk. For the greatest quantity of silk proper for manufactures, not less than one hundred pounds weight produced by any person in Malta, or islands near adjacent thereto, in the possession of Great Britain in the year 1812, from silk-worms bred there; the gold medal, or fifty guineas.

Specimens of the silk, not less than one pound, with an *account* of the method in which the silk-worms were managed; the kind and size of the mulberry-trees from whence they were furnished with food, and particulars respecting the culture of the mulberry-trees for that purpose, to be produced to the Society on or before the first Tuesday in March, 1813.

193. For the next greatest quantity, not less than fifty pounds, on similar conditions; the silver medal, or twenty guineas.

Satisfactory *certificates* from the governor or commander in chief of the district where the said silk was produced, and of the several particulars above-mentioned, to be delivered to the Society along with the samples required.

N. B. The same premiums, on similar conditions, will be given for silk produced in the years 1813 and 1814, *certificates* to be sent at the same time of the years ensuing.

PREMIUMS OFFERED FOR THE ADVANTAGE OF THE BRITISH SETTLEMENTS IN THE EAST INDIES.

194. Bhaugulpore Cotton. To the person who shall import into the port of London, in the year 1811, the greatest quantity, not less than one ton, of the Bhaugulpore cotton, from which cloths are made in imitation of nankeen, without dyeing; the gold medal.

A quantity of the cotton, not less than five pounds weight, in the pod, and five pounds carded, to be produced to the Society, with proper *certificates*, signed by the Secretary of the Board of Trade of Bengal or Bombay, on or before the last Tuesday in February, 1812.

195. Annatto. To the person who, in the year 1811, shall import into the port of London, from any part of the British settlements in the East Indies, the greatest quantity of annatto, not less than five hundred weight; the gold medal.

A quantity of the annatto, not less than ten pounds weight, to be produced to the Society, with proper *certificates*, signed by the Secretary of the Board of Trade of the respective settlement, that the annatto is the produce of such settlement, on or before the last Tuesday in February, 1812.

196. True Cochineal. To the person who, in the year 1811, shall import into the port of London, from any part of the British settlements in the East Indies, the greatest quantity of true cochineal, not less than three hundred weight; the gold medal.

A quantity of the cochineal, not less than three pounds weight, with proper *certificates*, signed by the Secretary of the Board of Trade of the respective settlement, that the cochineal is the produce of such settlement; to be produced to the Society on or before the first Tuesday in February, 1812.

N. B. The premiums from No. 194 *to* 196 *inclusive, are all extended two years further on similar conditions. Certificates to be produced at the same time of the years ensuing.*

GENERAL CONDITIONS.

AS the great object of the Society in rewarding individuals is to draw forth and give currency to those inventions and improvements, which are likely to benefit the public at large, candidates are requested to observe, that if the *means*, by which the respective objects are effected, do require an expense or trouble too great for *general purposes*, the Society will not consider itself as bound to give the offered *reward*; but, though it thus reserves the power of giving in all cases such part only of any premium as the performance shall be adjudged to deserve, or of withholding the whole if there be no merit, yet the candidates may be assured the Society will always judge liberally of their several claims.

All candidates are to take notice, that no claim for a premium will be attended to, unless the conditions of the advertisement are fully complied with.

All models of machines, which obtain premiums or bounties, shall be the property of the Society; and, where a premium or bounty is given for any machine, a perfect model and description thereof shall be given to the Society.

All the premiums of this Society are designed for Great Britain and Ireland, unless expressly mentioned to the contrary.

The claims shall be determined as soon as possible after the delivery of the specimens.

It is expected that all articles for claims or bounties be sent to the Society, carriage paid.

No person shall receive any premium, bounty, or encouragement, from the Society, for any matter for which he has obtained, or purposes to obtain, a patent, or for which he has obtained, or expects any premium or reward from any other Society.

A candidate for a premium, or a person applying for a bounty, being detected in any disingenuous method to impose on the Society, shall forfeit such bounty, and be deemed incapable of obtaining any for the future.

No member of this Society shall be a candidate for, or entitled to receive, any premium, bounty, or reward whatsoever, except the honorary medal of the Society. The candidates are, in all cases, expected to furnish a particular account of the subject of their claims; and where certificates are required to be produced in claim of premiums, they should be expressed, as nearly as possible, in the words of the respective advertisements, and be signed by persons who have a positive knowledge of the facts stated.

Where premiums or bounties are obtained in consequence of specimens produced, the Society mean to retain such part of those specimens as they may judge necessary, making a reasonable allowance for the same.

No candidate, not a member, shall be present at any meeting of the Society or Committees, or admitted at the Society's rooms, after they have delivered in their claims, until such claims are adjudged, unless summoned by the Committee.

The Society, anxious to promote the Arts of their country, have adopted the resolution of forming a Collection of Prints, to be open for public inspection; and, having arranged those already in their possession, invite engravers to send etched or finished proofs of their plates; and hope that amateurs, collectors, and publishers of works of art, will also contribute to the undertaking.

Prints of machines, or maps, will also come within the above arrangement.

The Society further invite the communications of scientific and practical men, upon all subjects connected with the views of the Society, although their experiments may have been conducted upon a smaller scale than the terms required by the premiums; as such communications

communications may afford ground for more extensive application, and thus materially contribute to the advantage of the public.

The Library of the Society, which has already become very valuable, may yet receive considerable additions and improvements from the presents of members, or other persons who may be inclined to place useful books or valuable manuscripts in a repository, at once permanent and conducive to the national benefit.

All communications are to be made by letter, addressed to CHARLES TAYLOR, M. D. the Secretary, *at the Society of Arts, &c. Adelphi, London.*

And where articles are sent by Sea for the Society, the Bills of Lading are to be addressed to the care of WILLIAM VAUGHAN, Esq. *Mincing-lane, London*, who has politely undertaken to receive them for the Society.

The Winchester bushel is the measure referred to for grain; and, as the acres of different districts vary in extent, it is necessary to observe, that the Society mean Statute Acres of five and a half yards to the rod or pole, when acres are mentioned in their list of premiums; and they request that all communications to them may be made agreeably thereto.

The Society desire that the Papers on different subjects sent to them may be full, clear, and explicit, fit for publication, and rather in the form of Essays than of Letters: and that descriptive Drawings may be sent, with the Models and Machines laid before the Society.

*** To persons inclined to leave a sum of money to this Society by will, the following form is offered for that purpose.

Item. I give and bequeath to A. B. and C. D. the sum of upon condition and to the intent that they, or one of them, do pay the same to the Collector, for the time being, of a Society in London, who now call themselves the Society for the Encouragement of Arts, Manufactures, and Commerce; which said sum of I will and desire may be paid out of my personal estate, and applied towards the carrying on the laudable designs of the Society.

N. B. The Society considering that it would be beneficial to the Commerce of the United Kingdom to bring the British Marbles into more general use, and that the most effectual method of accomplishing their object would be, for the present, *to make them more generally known in the capital, have come to the following resolutions:—*

Resolved.—That specimens of British Marbles be exposed in the Society's Rooms, in the Adelphi, for the inspection of the public, under the following regulations:

1st. That all the specimens be exact to a given size, *viz.* eight inches high, six inches broad, one inch thick, and polished on one face.

2. That a book be kept, containing the number of each specimen, and describing the situation of the quarry, the name of the parish where situated, the distance of the quarry from a beaten road, and the distance of that road from water-carriage, with the name of the donor and proprietor. Any remarks on the qualities of the marbles, or on the lime produced from them, will be gratefully received and preserved by the Society, as materials for future inquiries.

Resolved,—That as the exertions of the Society can be generally beneficial, only inasmuch as their views are seconded by the public, the Society request, that all persons proprietors of marble quarries, will favour them with a specimen of the marble, worked to the exact size above mentioned, with the description of the quarry as above, that the same may be entered in the book to be preserved for the use of the public. By such arrangements, it is expected that the interest of the proprietors of the quarries will be promoted, and the use of British marble much extended. A variety are already exhibited in the Society's Great Room.

The Society take this opportunity of returning their thanks to the several Societies and Individuals, who have favoured them with presents for their Repository and Library.

Premiums and Rewards bestowed by the Society of Arts, Manufactures, and Commerce, Adelphi, during their Session, which commenced on the fourth Wednesday in October, 1810, *and closed on the 3d of June,* 1811.

ON Tuesday the 28th of May, 1811, his Royal Highness the DUKE of SUSSEX, distributed the Rewards then adjudged.

IN AGRICULTURE.

To Andrew Bain, M. D. Heffleton, in Dorsetshire, for plantations of forest trees, class 14; the gold medal.

To William Congreve, Esq. Aldermaston House, Berkshire, for planting 377,520 larches, class 10; the gold medal.

To Mr. Henry Cowlishaw, Mansfield, for planting

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planting 75,000 larches, class 11; the silver medal.

To H. Andrews, Esq. Wakefield, for his plantations of oaks and ash trees; the gold medal.

To W. Jones, Esq. Foxdown Hill, near Wellington, Somersetshire, for temporary ricks to secure corn in sheaves in the fields from rain till quite dry; the silver medal.

IN CHEMISTRY.

To H. B. Way, Esq of Bridport Harbour, for a permanent stucco or plaster, for outside or inside walls; the silver medal.

IN POLITE ARTS.

To Miss Louisa Anne Phillipps, Wandsworth Road, for an original drawing, a view of Caermarthen; the silver pallet medal.

To Miss Eliza Phillipps, Wandsworth Road, for an original old painting, a view of Caerdiff; the silver pallet medal.

To Henry Parke, Esq. 67, Dean Street, Soho, for an original oil painting of a sudden squall off the coast of Sussex; the silver Isis medal.

To Phillip Rogers, Esq. Grove Mill Bay, near Plymouth, for an original oil painting of Oakampton Castle, class 112; the gold Isis medal.

To Mr. Denis Dighton, 4, Spring Gardens, for an original oil painting of the battle of Agincourt; the silver Isis medal.

To Mr. Thomas Mann Baynes, Castle Street, Oxford Market, for an original drawing of a landscape, class 105; the silver medal.

To Miss Tattersall, Hall's Place, Charing, Maidstone, for a drawing of a group of Garden Flowers, a copy from Hewlett; the silver pallet medal.

To Miss F. Tattersall, Hall's Place, Charing, Maidstone, for a drawing of a group of wild flowers, a copy from Hewlett; the silver pallet medal.

To Mr. James Craig, 88, Charlotte Street, Fitzroy Square, for an original etching of an historical subject from a picture by Guido Reni; the silver Isis medal.

To Mr. John Scott, Rosoman Street, Spa Fields, for two original engravings of fox hunting, class 120; the gold medal.

To Mr. Thomas Wyon, Jun. 20, John Street, Blackfriars Road, for medal die engravings, representing Peace checking the fury of War, class 126; the gold Isis medal.

To Mr. George Phillipps, Wandsworth Road, for an original design of a theatre, consisting of plan, elevation and section, class 110; the gold Isis medallion, bearing the following inscription: *The premium given by the Society for the Encouragement of Arts, Manufactures, and Commerce, in conformity to the will of John Stock, Esq. of Hampstead.*

To Miss Eliza Wright, Thomas Street, Woolwich, for an original drawing of flowers; the silver medal.

To Miss Frances Fitz-Harding Ryves, of Hale Hall, in Cumberland, for a drawing of a Concert of Music, a copy from Dominichino; the silver pallet medal.

To Mr. Isaac Jopling, 23, Fitzroy Place, Fitzroy Square, for a plaster cast, a copy of the Gladiator; the silver pallet medal.

To Mr. S. Sutton, 8, New Road, opposite Fitzroy Square, for a plaster cast of Hercules rescuing Dejanira from the Centaur Nessus, modelled from a rude sketch of an Italian master; the silver medal.

To Mr. Thomas Tyley, 23, Upper Mary-le-bone, for a plaster cast of Christ healing the sick at the pool of Bethesda, an original group; the silver Isis medal.

To Mr. Josephus J. P. Kendrick, 5, Upper Mary-le-bone Street, Fitzroy Square, for a plaster cast of a Gladiator Moriens, modelled from a private study of his own from nature; the silver Isis medal.

To Miss Emma Eleonora Kendrick, 6, Upper Mary-le-bone Street, for a drawing of a warrior from Georgione; the silver pallet medal.

To Miss Dudley, 34, King Street, Soho, for a drawing of a sleeping boy, a copy from a print by Bartolozzi; the silver pallet medal.

To Mr. R. D. Cathery, 12, Mead's Row, near the Asylum, Lambeth, for his method of fixing chalk drawings, class, 120; twenty guineas.

To Mr. I. Brewster, 4, Winchester Place, Pentonville, for a pen and ink drawing of Bacchanals, a copy from an engraving by Bartolozzi, class 107; the silver medal.

To Mr. John Carver, 37, London Street, Fitzroy Square, for a chalk drawing of a female head after Raphael, a copy; the silver pallet medal.

To Master W. C. Ross, 6, Frith Street, Soho, for an original historical drawing of Samuel presented by his mother to Eli the high priest; the silver medal and twenty guineas.

MANUFACTURES.

To Mr. Edward Smith, Brentwood, Essex, for cordage and cloth made from nettles; the silver Isis medal.

To Mr. John Robertson, St. Mary's Wynd, Edinburgh, for an improvement in weaving tartan or plaid hose; the silver medal or ten guineas.

IN MECHANICS.

To Captain T. M. Bagnold, of the Royal Marines, High Row, Knightsbridge, for a gun and carriage to clear the tops of the enemy's ships from marksmen in close action, the silver medal.

To John Stephens, Esq. Reading, for a method of making bricks for closures and other useful purposes; the silver medal.

To Henry Earle, Esq. Hanover Square, for an improved bed for persons whose limbs are fractured, or who are sick and infirm; the silver medal.

To Mr. George Webster, Leeds, for his mode of conveying steam from boilers, and preserving the air clear from vapours; the silver medal.

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To Mr. J. Allan, Blewitt's Buildings, Fetter Lane, for a reflecting circle, in which the screens can be readily shifted in taking altitudes; the silver medal and twenty guineas.

To Mr. John Hodgson, Charles Street, St. James's Square, for a method of correcting the variations of the mariner's compass; the silver medal.

To Mr. John Prior, Nessfield, near Skipton, in Craven, for improvements in the striking part of a clock; the silver medal and ten guineas.

To Mr. John Fuller, 14, Hatton Garden, for an improved scarificator, by which cupping is better executed; the silver medal.

To Mr. Richard Bridgen, for a method to prevent the inhaling of noxious vapours in gilding metals; twenty guineas.

To Mr. Thomas Wood, Great Berkhempstead, Herts, for an invention to prevent prejudicial effects to the persons employed in pointing needles; the silver medal.

To Mr. William Brunton, Butterley Iron Works, in Derbyshire, for an improved pump for raising the water whilst wells are sinking or making; the silver medal.

To Mr. George Prior, Jun. of Otley, in Yorkshire, for an improved remontoire escapement for pendulum clocks; twenty guineas.

IN COLONIES AND TRADE.

To Francis Fortune, Esq. 8, Lower Thames Street, for curing British white herrings, in the Dutch method, class 165; the gold medal.

To Mr. Peter Sleavin, 7, Little Brook Street, Hampstead Road, London, for curing British white herrings; fifteen guineas.

The LIST of PREMIUMS offered may be had, *gratis*, at the Society's House in the Adelphi:

By Order of the Society,

June, 1811. CHARLES TAYLOR, M. D. Secretary.

N. B. Where errors have arisen in the address of any Member of the Society, information is desired to be given to Mr. R. Elwin, the Collector, at the Society's house in the Adelphi, who receives the Subscriptions from the Members and furnishes Receipts for the same.

Lately was published, Price 10*s.* 6*d.*

THE TWENTY-EIGHTH VOLUME of the SOCIETY'S TRANSACTIONS, which may be had from the Housekeeper, at the Society's House in the Adelphi. Also complete Sets of their Transactions, or any single Volume.

Also, An ANALYTICAL INDEX of the FIRST TWENTY-FIVE VOUMES of the TRANSACTIONS of the SOCIETY, to the Termination of their Session, June 1807, price 5*s.*

A CATALOGUE of the BOOKS in the Society's Library may be procured as above, price One Shilling.

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PAPERS

IN

AGRICULTURE.

The GOLD MEDAL *was this Session adjudged to* A. BAIN, M. D. *of Curzon-Street, for his Plantations of Forest Trees made at Heffleton, in Dorsetshire. The following Communications were received from him.*

DEAR SIR,

ABOUT three years ago, I had the honour to communicate to the Society of Arts, an account of some Plantations I had made at Heffleton, in Dorsetshire, and on that occasion my success was rewarded by the Honorary Premium of the Society. As you have seen and reported the flourishing condition of those Plantations, I will proceed to state, that I have been induced by various motives, and encouraged by the Society's approbation, to make farther exertions in the same line of improvement, by covering such parts of my

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estate as are not adapted *to the purposes of husbandry*, with trees that are suited to the nature of the soil. My enclosures were multiplied, and on a large extent of heath land, exceeding one hundred and twenty-five statute acres, which had been previously well-fenced from the depredations of Sheep and Cattle, and where holes at 4½ by 5 feet asunder, had been made in the manner particularly described in my last communication. I began to plant in the Autumn of 1807. Between the 25th September of that year, and the 30th of April, 1808, I planted out on that ground 258,519 trees, as specified in the following List:—

Scotch Fir,	-	249,700
Pinaster,	-	5,410
Larch,	-	2,150
Spruce,	-	1,259

The greater part of those Trees had been raised from seed in my own Nursery, where they had been also transplanted, and were finally planted out some at two, and others at three years old.

The soil of this Plantation is gravelly and poor, the situation rather elevated, and a good deal exposed to the influence of the sea winds from the south coat; yet in spite of those circumstances, the young trees are in a very healthy thriving state, as you will see attested by two Gentlemen who live in my neighbourhood, who are Planters themselves, and well qualified to judge accurately on subjects of this kind. It is my intention to fill up this and all my fir plantations with Pinaster only, as on such soils and exposures it is the best nurse for the others; it grows most rapidly, is quite regardless of the sea winds, and is also when ripe a tree of

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of considerable value. A passage in Mr. Kent's Survey of Norfolk, published in 1796, first attracted my attention to this tree, and an intimate acquaintance with it since that period had increased my opinion of its good qualities. In the latter end of the year 1798, I planted out some Pinaster seedlings of one year old on very poor ground. My Gardener measured three of those trees in the course of the present month, and their dimensions will be found by referring to the following table. Some Larch of three years old were planted out at the same time, but on land of a better quality, yet not exceeding the rate of five shillings an acre per annum. The growth of the Larch is also noted in the table.

	Circumference at the ground.		Circumference 3 feet above the ground.		Circumference 6 feet above the ground.		Height.	
	Feet.	Inch.	Feet.	Inch.	Feet.	Inch.	Feet.	Inch.
Pinaster,								
No. 1.	3	0	2	4	1	10	20	0
No. 2.	2	8	2	0	1	4	17	0
No. 3.	2	5	1	10	1	4	18	3
Larch,								
No. 1.	3	0	2	0	1	7	24	6
No. 2.	2	6	1	9	1	6	23	9
No. 3.	2	5	1	8	1	5	23	11

It is ascertained, I believe, that the wood of Larch in a favourable situation comes to perfection at forty years old, that of Pinaster at sixty, and that of Scotch Fir at eighty years growth. Having planted between five and six hundred statute acres, chiefly with these three species of fir, I will leave to others the calculation of their probable value at the different periods of their fall, and I trust the Society will agree with me in thinking, that such land as I have de-

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scribed, could not have been cultivated to equal advantage in any other way.

With my warmest wishes for the prosperity of the Society,

I am, Dear Sir,

Your very faithful and obliged Servant,

A. BAIN.

Curzon-Street, Nov. 27, 1810.

To C. TAYLOR, M. D. SEC.

DEAR SIR,

WHEN the communication for the Society of Arts which I addressed to you last week was drawn out from my papers, I was confined to my bed by severe indisposition, or I should have called to your recollection that the plantation there described, was not the only one I made in the course of the Autumn 1807. On a piece of land exceeding twelve statute acres, which had once been under the plough, but which my tenant wished to give up as little calculated for the purposes of husbandry, I planted 13,100 Ash, 8,150 Hasel, 4,560 Oak, 3,675 Laburnum, 2,000 Sycamore, with a proportion of Birch, &c. You inspected the plantation with me two years ago, and at that time it had a most promising appearance. On viewing it, however, in the month of October last, those hopes were not found to be realized; for the ash, which was the principal plant, was by no means in a thriving state. I have given directions to my Gardener to cut down the ash plants within an inch of the ground, to cut drains in the lower parts of the field where they were chiefly

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chiefly planted, to replace such as are dead with birch, or in better spots with chesnut and oak, and to mix Scotch fir with the deciduous trees, for the purpose of promoting shelter and warmth throughout the plantation. I may probably hereafter take an opportunity of acquainting the Society with the success of those means in improving the appearance of this plantation, to which I have now drawn your attention, because I have reason to know that the Society of Arts, with that liberality and sound judgment which characterize all their proceedings, encourage exertion as well as success; and although it is on the latter I presume to ground my claim to the honorary reward of the Society, yet the former, I am well persuaded, will not be overlooked.

I am, Dear Sir,
Your most obedient humble Servant,
A. BAIN.

Curzon-Street, Dec. 13, 1810.

To C. TAYLOR, M. D. SEC.

TREES planted by RICHARD VINCENT, from the 25th of September, 1807, to the 30th of April, 1808, on a large quantity of Heath Land, being nearly two thousand trees to each acre.

The trees were mostly taken out of Dr. Bain's Nursery, and were well-rooted plants.

Scotch Fir, 249,700,	Pinaster, 5,410,
Spruce, 1,259,	Larch, 2,150.

RICHARD VINCENT,
Gardener and Nurseryman to
Dr. BAIN.

Heffleton, Oct. 5, 1810.

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CERTIFICATES *by the Right Hon.* NATHANIEL BOND, *and* THOMAS BARTLETT. Esq. *respecting* Dr. BAIN'S *Plantation.*

WE desire to certify, that we have examined the land stated to have been planted as above, by Dr. Bain, at Heffleton, between the 25th of September, 1807, and the 30th of April, 1808, that it is not fit for the purposes of husbandry, that it is thoroughly well-fenced from sheep and cattle, and that the trees are generally in a healthy thriving state.

NATHANIEL BOND,
THOMAS BARTLETT.

Heffleton, Oct. 5, 1810.

The GOLD MEDAL, *being the Premium offered in Class 3, for raising Oaks, was this Session adjudged to* HENRY ANDREWS, Esq. *of Wakefield, from whom the following Communications were received.*

SIR,

UNDERSTANDING that the Society of Arts, &c. give Premiums for the encouragement of Planting, I am induced to take the liberty of sending you an account of Trees planted by me, on my estate at Kirkby-cum-Osgodby, near Rasen, in the county of Lincoln, which I hope will prove satisfactory to the Society. The oaks under article No. 3, seem to have a particular claim, as I have planted twenty-two thousand

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thousand of them in the space of two years. The soil is of a very deep sandy nature, and not calculated to pay the expense of tillage. The plantations are fenced by a very thick and high sod wall.

Inclosed I send you a Certificate from my Gardener, J. Smith, of the trees planted there, with the numbers, sorts, and ages; also a certificate of two respectable witnesses, who have examined the plantations very lately, the one is a Catholic priest, the other a considerable farmer. Twelve thousand of the oaks were planted in February and March, 1809, amongst other forest trees in the plantation containing 86 acres, 3 rods, 10 perches; none of them are less than four, and many of them five years old. The remaining ten thousand oaks were planted in like manner in 1810, in a plantation containing 42 acres, 1 rod, and are three and four years old; the whole of the 218,760 trees planted on my estate abovementioned, were raised about three miles from the place where they now stand.

I am, Sir,

Your most obedient humble servant,

H. ANDREWS.

Wakefield, Dec. 29, 1810.

To C. Taylor, M. D. Sec.

Certificates.

Rasen, Dec. 25, 1810.

I, James Smith, of Rasen, in the county of Lincoln, gardener and planter, do hereby certify, that I planted the under-mentioned trees for Henry Andrews, of Wakefield,

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in the county of York, Esq. upon his estate at Kirkby-cum-Osgodby, near Rasen, in the county of Lincoln.

In February and March 1809.		In February and March 1810.	
Black Italian Poplars -	500	Black Italian Poplars -	1,000
Huntingdon Willows -	1,000	Huntingdon Willows -	1,000
Sycamoors -	660	Ash - -	5,000
Ash - -	6,000	Oaks - -	10,000
Oaks - -	12,000	Scotch Firs -	48,000
Scotch Firs -	45,000	Birch - -	8,000
Birch - -	8,800	Larch - -	20,000
Larch -	10,000	Spruce - -	20,000
Spruce - -	10,000	Alders - -	10,000
Alders - -	1,800		
	95,760		123,000

That out of the 95,760 trees planted in 1809, there are 63,160 trees, which are now five years old; and 32,600 trees which are now four years old; and that out of the 123,000 trees planted in 1810, there are 75,000 trees which are now four years old, and 48,000 trees which are now three years old; that they are planted on bad sandy land, not calculated to repay the expence of tillage; that the whole of the plantations are well-fenced with sod walls, five feet high, and three feet and a half thick; and lastly, that the whole of those trees are now in a healthy and thriving state. I am, &c.

JAMES SMITH.

Rasen, Dec. 24, 1810.

WE, the undersigned, do hereby certify, that we have examined the plantations at Kirkby-cum-Osgodby, near Rasen, in the county of Lincoln, belonging to HENRY ANDREWS, of Wakefield, in the county of York, Esq. and that we found the trees and fences agreeable to the above statement.

WILLIAM HARRIS,
THOMAS LAMBERT.

Mr.

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Mr. ANDREWS, who had been some time indisposed, died previous to the time that notice was sent to Wakefield of the Premium being adjudged to him, and in consequence of the following letter from his widow, the Gold Medal was delivered to her for his daughters, through the hands of THOMAS PITT, Esq. Vice-President.

SIR,

I HAD the honor of receiving your favor of the 3d instant, addressed to my late husband, Mr. ANDREWS, whom I had the misfortune to lose the 14th ult. I know few things that would have given him more pleasure than the contents of your letter: he has left two daughters, co-heiresses of the estate on which the oaks are growing; if the high honor should be conferred on them which was intended for their deceased father, it will be acknowledged with grateful thanks and due respect by them, and,

Sir,

Your most obedient humble Servant,

M ANDREWS

Wakefield, May 8, 1811.

To C. TAYLOR, M. D. SEC.

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The GOLD MEDAL *was this Session adjudged to* WILLIAM CONGREVE, Esq. *of Aldermaston House, Berkshire, for planting* 377,520 *Larches, being the Premium offered in Class* 10. *The following Communications were received from him.*

SIR,

I WAS last year honored by the Society with a Gold Medal for having planted with acorns about seventy-three acres of land in this parish, and in the neighbouring parish of Ufton; and I have great pleasure in informing the Society, that the plantations for which I received the Medal, continue in a very flourishing state.

I now beg leave to transmit to you a Certificate of my having planted, since January 1808, 684,560 Larches, in this and the adjoining parish of Mortimer, upon one hundred and ninety acres of a poor flinty heath, which has been lately inclosed. The plants used in 1808 and 1809 were one year's seedlings, most of which came from Scotland, and were purchased in London for five shillings a thousand; but all the Larches which I planted last spring were purchased the preceding spring, and had been one year in a nursery, which is the plan I always mean to adopt in future, as I find they are much better able to contend with the heath than the seedlings. The latter also are frequently heated by their long passage from Scotland, and I once lost several thousands from this cause. On one hundred and eight acres of land in Mortimer parish, the trees were planted in rows at the distance of three feet from each other, and the plants in

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in each row at the same distance. On fifty acres in Aldermaston parish, planted in 1809, the trees were planted at six feet each way, excepting near the outsides, where they were planted only three feet asunder, and on thirty-two acres in Aldermaston, planted in 1810, they were four feet each way, which is the distance I think preferable to any other.

Small holes were made at the time of planting with a pick-axe, and the roots of the plants carefully covered and trodden down. Whenever it is ascertained that any of the plants have died, their places are immediately filled up, so that many thousands have been planted beyond the number here mentioned. I intend to plant about one hundred acres more of the same heath next Spring; and hope to extend my plantations of Larch in this neighbourhood to five or six hundred acres. In a small plantation of Larch, made in the year 1806, I measured, in October, some of the last year's shoots, and found several to exceed three feet, and one was three feet nine inches.

Should the above communication be thought worthy of notice by the Society of Arts, I shall be happy at some future time to report the progress which the plantations may make.

I have the honor to be, Sir,

Your most obedient humble Servant,

WILLIAM CONGREVE.

Aldermaston House,
Nov. 9, 1811.

To C. Taylor, M. D. Sec.

Certificate.

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CERTIFICATE.

WE, the undersigned, having resided in the neighbourhood of the above-mentioned plantations for some years, and having had frequent opportunities of seeing them, do hereby certify, that the foregoing statement is perfectly correct; and we further certify, that all the plantations are well-fenced, and are now in a flourishing condition. In February and March 1808, three hundred and seventy-seven thousand five hundred and twenty Larches were planted on seventy-eight acres of land in Mortimer parish; in February and March 1809, one hundred and forty-five thousand two hundred Larches were planted on thirty acres of land in Mortimer; and seventy-four thousand eight hundred on fifty acres of land in Aldermaston parish; and in February and March 1810, eighty-seven thousand and forty were planted on thirty-two acres of land in Aldermaston parish.

G. H. DEANE,
Minister of Aldermaston;
W. STEPHENS;
W. HICKMAN.

The SILVER MEDAL *was this Session voted to Mr.* HENRY COWLISHAW, *of Mansfield, for planting* 75,000 *Larches, being the Premium offered in Class* 11. *The following Communications were received from him.*

SIR,

BETWEEN the 30th of March and the 20th of April, 1808, I planted a piece of land with Larch trees; it is situated upon

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upon Blidworth Forest, (part of Sherwood Forest), and is by admeasurement, including the fences, fourteen acres three rods.

The land being chiefly covered with heath from six to eighteen inches high, I caused a piece of the heath-sod to be pared-off with a paring-spade, of a sufficient space to plant the tree in, and the soil being very thin and near the gravel, I preferred planting the tree without turning over the soil.

The season being far advanced, and having not been sooner in possession of the land, I ordered that the roots of the trees should be made wet with water, and then rubbed over with soil, which thus adhered to the roots, and in this state they were planted in the proportion of rather more than five thousand trees upon each acre, having planted seventy-five thousand trees upon the land, which is not more than fourteen acres, allowing for the fences.

The Larch trees were two years transplanted, and from eight to fifteen inches high when planted out.

The season proved very favorable, few of the trees died, as one thousand filled up the deficiencies in the autumn of 1808, and the remainder grew well. In the autumn of 1809 they were again filled up with the same number, and I have this month supplied all the deficiencies with two thousand more, as some had been destroyed by rabbits.

The plantation is now in a healthy growing state; the last season it hath much improved.

I think the above mode preferable either to destroying the heath, (as I presume it preserves the moisture in the soil during the summer, and affords warmth in the winter), or making holes by turning up the soil, and bringing what is bad upon the surface.

I am justified in these remarks from plantations adjoining mine, where both modes have been tried, and neither have answered

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answered so well as my method. My plantation is protected by a quick fence, which was planted in 1808, and secured by good posts and rails all round; the quicks have grown very well, considering the nature of the soil, which is but barren, and they are likely to become a good fence.

I have sent you an account of the expences which have attended this plantation, and have inclosed Certificates from two of the most respectable inhabitants of the town of Blidworth, and remain, with great respect,

Sir,

Your humble and obedient Servant,

HENRY COWLISHAW.

Mansfield, Dec. 20, 1810.

To C. Taylor, M. D. Sec.

An Account of the Expences.

	£.	s.	d.
Purchase of the land and stamp -	200	16	0
Seventy-nine thousand Larches at 1*l.* per thousand - - -	79	0	0
Posts and rails - - -	30	9	0
Paring, planting, and putting-down the fences	38	0	0
Carriage of trees, &c. - -	2	16	0
Cleaning the trees first and second year, where the heath in any measure incommoded them	2	11	0
Expences of filling-up the deficiencies -	3	0	6
	356	12	6

Certificates

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CERTIFICATES were received from Mr. THOMAS HANESWORTH, and Mr. JOHN HEATH, stating that they had reviewed the above-mentioned plantations, and believe the statement to be correct, and that the trees are effectually fenced and secured to grow timber, and are in a flourishing condition.

The SILVER MEDAL *was this Session voted to* JOHN STEPHENS, Esq. *of Reading, in Berkshire, for his method of making Bricks, so as to form cheaper and firmer Buildings, and useful underground Drains. The following Communications were received from him, an Explanatory Engraving is annexed, and Specimens of the Bricks are preserved in the Society's Repository.*

SIR,

I HAVE sent, for the inspection of Society of Arts, &c. three closure bricks, which on examination you will find to have been cut three fourths of the way through in the middle by a wire, and the whole of the way through at each end, which leaves the ends square and handsome for work.

The bricklayer to divide each brick in length has only to take the brick in his left hand with the mark, or cut downwards longitudinally, and by one smart blow with the trowel he will have two complete king-closures, with which he can easily make four common closures.

I have shown them to many workmen, who all approve of them. I had two hundred and fifty of them made by a brickmaker for an experiment, and I have ordered two thousand

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thousand more. The builders who do the principal part of my work have had some on their own account, and have since increased their orders. I have no doubt when they are better known they will come into general use.

A considerable saving in labour and waste of bricks may be effected by their use, particularly in walls where piers are built, and where there are many openings, the work will also be rendered more substantial.

There will be a saving in room and materials where the back of a chimney is built against a straight wall, particularly in flues for low buildings.

They will be found useful in cities or large towns by being placed in partition walls instead of lath and plaster, and be a check to the ravages of fire.

They will be useful in preventing the passage of rats and mice, and the disagreeable smell occasioned when they die betwixt lath and plaster or wainscoat.

They will also answer for draining land, and will form cheaper small drains from houses than any other method.

They may be cut in other forms or directions for particular purposes according to the uses for which they are intended.

The additional expense of dividing them by the wire is about two shillings per thousand, it is generally done after they have been molded one or two days according to the dryness of the season.

I flatter myself that if this communication meets with the approbation of the Society, it will render a benefit to the public.

I am, Sir, with much esteem,

Your most obedient servant,

JOHN STEPHENS.

Reading, October 31, 1810.

To C. Taylor, M. D. Sec.

Dear

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DEAR SIR,

On inquiry from builders, I am informed, that the saving by the use of the bricks I have invented, will be from two and-a-half to nearly five per cent. in a five-window house in brick work and labour, in a front of forty feet with or without piers.

In ornamental brick piers for gateways, I think the saving of bricks by means of cutting may be very considerable, and in the labour still more, besides the work being done more sound and substantial.

I am using a few of them in an eleven-inch brick-wall, (a system hitherto entirely new,) in a westernly aspect, as a preventative or guard against the effects of weather, and it will, in point of dryness, be equal to a fourteen-inch wall. I have inclosed a letter from Benjamin Garroway, a bricklayer, who has requested me to let him have all the bricks I have of this kind, and to bespeak more for him. I have also sent a Certificate from Mr. Robert Wright, who is extensively engaged in buildings.

The drains for agricultural purposes might be done by women or children, except the digging of the drains, especially two-inch drains. With respect to longer drains, if they are required of four inches, and to be covered with brick, I would recommend the bricks to be laid anglewise, in order to promote strength in covering.

It would be of great importance if Parliament would allow a drawback of the duty on all bricks employed in draining.

Every brick intended for the operation I recommend, is taken off the stack two or three days after it is molded. It is then put on a stool or board, and a wire, about the size

 of

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of No. 23, is pressed on the upper side of the brick, so as to pass through each end of it, it is then immediately placed on the stack again, and afterwards burned.

I am, Dear Sir,

Your most obedient humble servant,

JOHN STEPHENS.

Reading, December 8, 1810.

To C. Taylor, M. D. Sec.

Letter from Mr. Richard Billing, to Mr. Stephens.

SIR,

Agreeably to your request, I have taken into consideration the utility of your closure bricks, and beg leave to say that my opinion coincides with yours, as to their advantage in new chimnies which are intended to be built against old walls. In constructing a new chimney it is generally considered absolutely necessary, that the same should be worked up close to the old wall, but completely unconnected, in order that it might settle from the old; in this case it is very desirable to make the back of the chimney as thin as possible, that it may project as little as convenient, and in building piers, particularly small ones, either for gate-ways or fronts of houses, where there are many bricks, and in the present mode which is so frequently adopted, of two-inch recesses at the exterior of the windows, your closures would be much preferable even in appearance to a brick which has been cut with a trowel, with the surface of course defaced.

Closure

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Closure bricks might be adopted as a cheap and useful drain by a common brick flat, with two closures laid on the same two inches asunder, or four inches and reversed.

Your closures would be useful in all kind of ornamental brick work.

Two inches is a very desirable brick, but most times avoided in consequence of the waste in cutting common bricks, and difficulty in producing a smooth face, which would be completely obviated by the introduction of closure bricks.

I remain, Sir,

Your obedient humble servant,

RICHARD BILLING.

Reading, December 3, 1810.

To JOHN STEPHENS, Esq.

Letter from Mr. Benjamin Garroway, to Mr. Stephens.

SIR,

I AM of opinion that if closures were made for general use, two and-a half per cent. would be saved in brickwork of small piers, flues of chimneys, or where there are any bricks in ornamental works. Common bricks frequently will not cut more than one closure, and if your bricks were to be always had, they would be much more useful.

I remain, Sir,

Your humble servant,

BENJAMIN GARROWAY.

Ruscombe, December 5, 1810.

To JOHN STEPHENS, Esq.

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Letter from Mr. Robert Wright, to Mr. Stephens.

SIR,

HAVING examined your method of cutting bricks, I am of opinion that they would be particularly useful in all kinds of brickwork, make a considerable saving in labour and materials, and that a much superior bond would be obtained by your improvement.

You are perfectly at liberty to make any use you please of my opinion.

I am, Sir,

Your very obedient servant,

ROBERT WRIGHT.

No. 5, New North-street, Red Lion-square.
London, December 6, 1819.

To JOHN STEPHENS, Esq.

Description of the Drawings of Mr. Stephens method of cutting bricks for various purposes. See Plate I, Fig. 2.

Fig. 2. of plate 1, is a plan of the upper surface of a common brick, the line *a a* is a cleft cut nearly through the brick while it is soft by means of a piece of wire, as is shewn in the section, fig. 3, where the section of brick is shown at BB, placed on the wooden block A, a piece of wire *b b* with a loop

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a loop at each end is pressed down into it, so as to divide it into two parts, except the part C, which the wire will not cut through because of the curvature it acquires in being pressed into the brick. A brick of this kind being burnt, may be broken in two halves by one cleft with the trowel, which will be found very useful in many cases which constantly occur in brickwork, and will be far superior to the present mode of hacking the bricks, both for the soundness and appearance of the work, and will be done in less time.

Figs. 4 and 5, shew the application of these divided bricks to draining, where A B are the ends of the two halves of a brick, and C D tiles, forming the top and bottom of the drain, this method forms a square drain.

Fig. 5, shews how a triangular drain may be made with half the number of bricks of the foregoing, that is one-half brick A, and two tiles C D.

Fig. 6, is a plan of a brick divided diagonally, and fig. 7 shews how these halves may be disposed to form a triangular drain; the letters shew the same parts in each of these two figures, the bottom D may be made of tile, or of a brick cut in half in its thickness; the scale annexed to the figures will shew the dimensions of the different drains.

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The SILVER MEDAL *was this Session voted to* WILLIAM JONES, *Esq. of Foxdown-Hill, near Wellington, Somersetshire, for the Invention of a Temporary Rick to secure Corn in Sheaves in the Fields till quite dry, also Clover, Peas, and Beans. The following Communications were received from him, two Explanatory Engravings are annexed, and a Model of the Rick is preserved in the Society's Repository.*

SIR,

THE very unusual quantity of rain that fell during the months of August and September last, with scarcely two days of dry weather following, in this neighbourhood, put farmers to the necessity of having recourse to various modes of preserving their corn, and, as I understand the Society of Arts has offered a Gold Medal for the cheapest and best mode of harvesting corn, and also for making hay in wet weather, superior to any hitherto practised, I beg leave to communicate some experiments I made last summer, and the result of them. In the first place, I put some wheat in small round ricks, or wind-rows, made in the common way of this county, but afterwards recollected that the uncommon wetness of the ground might render the under part damp, I thought it prudent to examine them, (about ten days after they were set up), and found my apprehensions so well founded, that I had the whole spread abroad; and have no doubt that, if they had remained a little longer, the corn would been materially injured, not the bottom only, for it had contracted dampness a great way up the ricks, insomuch that

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Foundation of Mr. Wm. Jones's Temporary Corn Rick.

Fig: 1.

Mr. Stephen's Method of dividing Bricks.

Fig: 2.

Fig: 4.

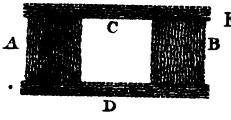


Fig: 3.

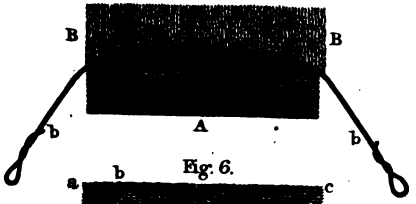


Fig 5.

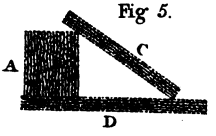
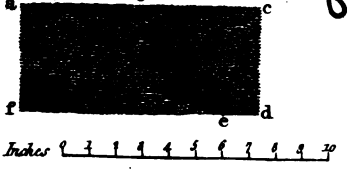
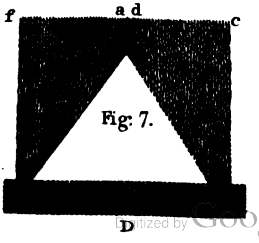


Fig: 6.





Drawn by J. Farey.

Engraved by J. Porter.

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that I turned my attention to devise some better mode of preserving my barley in case the weather continued so rainy, as it afterwards proved. I had observed in some wet seasons before this, that many of our farmers, not being able to get their barley dry enough to put into a large rick, had set up narrow ricks, containing the produce of an acre or two, each in different parts of the same field it was grown, for the sake of expedition; and though some straw was put under them, yet the bottom contracted a great degree of dampness, so as to occasion it to smell old, and the clover was killed where these ricks had stood. My object was to prevent both these injuries; and it occurred to me, that four gate-hurdles would answer both purposes, by setting the two outside ones perpendicular, and two middle ones inclining against and supporting each other. These hurdles are usually eight feet long; the two heads in which the four bars are mortised have pointed ends of about a foot and a half long; the two outside ones are to be forced into the ground nearly to their full length, so that the middle brace may rest on the ground to afford some support, and the two middle was about six inches to keep them steady. The foot of the second hurdle should be set two feet from the foot of the first, the third three feet from the second, and the fourth two feet from the third, making seven feet, and occupying a space of seven feet by eight, for barley or oats, but wheat being longer in the straw, requires the distance to be wider, viz. three feet from the first to the second, three feet from the second to the third, and three feet from the third to the fourth, which will be nine feet by eight.

It will be proper to put seven or eight small stakes, (a little bigger than a man's thumb,) from the second bar of the first hurdle to the second bar of the second hurdle, and from the second bar of the third to the second bar of the fourth, to

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support the sheaves from the ground, to admit air under and prevent injury to the growing clover; or small poles may be used extending from one outside hurdle to the other. The appearance of the ends of the hurdles will be as in the engraved plans, plate 1, fig. 1, and section plate 2, fig. 1, which shew where the small stakes are to be placed to prevent the sheaves touching the ground, for there will be but a slight pressure on them, since the ground end of the sheaves are to be put against the hurdle A B, and the ears of the corn a little elevated to rest against the hurdles C D, and the ears a little elevated against the centre hurdles C D; so that the ears of the corn will be all within side, and have the benefit of the air between C and D. It is to be observed that the hurdles C D being but six inches in the ground, and the hurdles A B nearly eighteen inches, that the two former will be a little higher than the two latter, which is necessary for two reasons, one is, that the higher these are, the higher the air is admitted to the middle of the rick, and the more they elevate the tops of the sheaves in the middle, for the ground ends should be lowest to shoot off the rain. But as it will be found that after two or three rows are placed around the tops of the hurdles, (for the ricks should be circular, that the ground ends of the sheaves being largest) the tops will become nearly level, when it will be necessary to put four sheaves as at G G in the middle horizontally, forming a square, opening in the centre, which will admit air from the top of the middle hurdles C D, through this space to the middle of the rick, as the ears of each sheaf are just to meet only in the middle resting on these four sheaves *, which

* If the corn should be very damp, and the rick made high, four other sheaves may be put higher up to convey a greater circulation of air, and operate as a bond to connect the sheaves in the middle, so that they cannot possibly slide outwards.

will

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will give such an elevation to the tops of them, that the ground ends will be sufficiently inclining downwards to shoot off any rain that may fall. In forming the roof, the sheaves are of course to be put farther in every time they are put around, till the roof terminates in a point, when two sheaves with the tops downwards spread abroad and bound with a straw-band, will secure it from a great deal of rain; but if the corn is to remain out long, a little reed or thatch may soon be put on each rick.

Fearing I might not have been sufficiently explicit in describing this plan, it has occurred to me that it would be better to send a model, containing 100 sheaves, made to a scale of an inch to a foot, as to the length of the hurdles, the distance from each other, and the size of the sheaves, also to exemplify every particular of it.

The weather being so rainy for some days after my barley was cut, with every appearance of more rain, I determined, on having a few hours intermission of rain, to get the middle of the field, which was a little more dry than the rest, and to put it in small ricks, containing more than the produce of an acre, on these hurdles in the same field; it was in such a damp state as to be totally spoiled in a common rick, but was taken from these ricks into a barn in the month of January last, perfectly dry, the straw much better than could have been expected, the grain good, having been proved to grow well, for having some doubt on account of being put together so damp, I had it first tried by putting a few grains in a cloth into the earth, and have since sown it, and no other this spring, and I never had a better prospect of a good crop. The remaining part of the barley that was left on the ground, was not taken in till ten days afterwards, the grain much grown, a great deal wasted by frequently turning, and the straw spoiled.

I flatter

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I flatter myself it will be admitted that in wet seasons, or when harvest is so late that, as the days decrease the dews increase, and of course remain so long that there are but few hours in a day for drying, even if there should be no rain, that this method will afford perfect security to corn that is cut dry, and put up in this manner immediately from the scythe or sickle, because if there should be grass in it, the ground end of every sheaf will be without side, exposed to the sun and air to dry; and as for the grain, no part of it can get damp, because the ears but just meet in the middle, through which the air passes from the bottom to the top sufficiently to dry it. I have mentioned sheaves, because in this county barley and oats are generally bound as well as wheat, but both the former may be placed in these ricks without binding, as I had some barley put in one of them (by way of experiment,) and think it to be the better mode when there is much grass in it, by carefully keeping the ears together when carried to the hurdles, where a man is ready to put it up to another on the top, and to place the ears inwards; and it is done in as short a time as the like quantity is put on a waggon, with this advantage, that whereas a waggon with three or four horses go over the clover to the great injury of it in wet weather, by this method the corn is carried by women or children in their arms to the hurdles, without the least injury to the clover, a consideration fully adequate to a little extra expence, if any, besides that of being more expeditiously secured; for every practical farmer will be sensible in how short a time an acre of corn may be carried from the circumference of an acre to its centre. As to the time of fixing these hurdles, I have ascertained that two people can fix them in five minutes, and one rick would contain the produce of two acres of barley or oats. The other advantages, besides the corn being thus sooner secured, are, that

no

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no more attendance on it is required, so that a farmer's attention may be better directed to his other harvest concerns, and that one or two of these ricks at a time, (as may be convenient,) may be taken into a barn to thrash, whereas a part of a large rick cannot be taken in without the trouble and expence of thatching the remainder, and be subject to the risk of rain before it may be covered again.

I trust it will be seen that by this plan there must be a great saving of the quantity as well as preservation of the quality of grain, which is known often times to shed a great deal by being frequently turned to get dry. Before I thought on this expedient (last barley harvest,) I am clear that a field of pease of mine required to be turned so often, that more shed out than were sown; and a farmer in this neighbourhood had a good crop of eight acres of vetches reduced to sixty bushels, by so frequently turning them for three weeks, without getting them dry at last; whereas an acre or two might have been taken up in this way a few days after they were cut, and the seed would have got sufficiently hard, but the greater part of these were so soft as to be much bruised in thrashing, and it was to be feared a great part of them would not vegetate. I had an opportunity of knowing the quantity, having the tithe of them, and proving the injury by the loss of my crop in sowing them, in so much that the land has been since ploughed.

Although I have not tried it, yet I think it is not to be doubted, but that this mode may be applied with equal advantage to clover hay, and clover seed, before it may be dry enough to put into a large rick, by being placed in this situation to dry without being so frequently turned as to deprive the hay of its finest parts, and subject the seed to great waste. In cases also when meadow hay may be dry enough to put in large cocks on the appearance of rain, how much injury

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injury do they receive by the bottom being rendered so wet as to occasion a dampness some way up, and require much time to throw abroad to dry? Whereas, in the same state of dryness, how many of such cocks may be put on four hurdles? and the bottom instead of being wet and injured will be perfectly dry, having air circulating under it, and from the two middle hurdles quite to the top; if a sheaf of reed was to be drawn-up through it, as the hay got higher, a bundle of straw on top would secure it from rain, or instead of a reed-sheaf drawn-up, a couple of small faggots of wood, or three or four poles bound together and placed horizontally about the middle of the rick, to admit air at each end, and render it dry enough to be carried on to a rick without farther trouble or risk.

Hay is known to receive injury, not only from rain, but even from fervent sunshine, when nearly dry, if not frequently turned, as may be observed by the change of colour and loss of smell, which many farmers in this neighbourhood experienced in the summer of 1809, for want of hands to turn it sufficiently. I have seen a decoction of such hay made in a tea-pot, and compared with a decoction of the like quantity of good hay in another, the former was very deficient both in colour and taste to the latter, and the quality of it, of course, much deteriorated.

We know that straw, particularly of barley or oats, will be much injured by being long on the ground exposed to soaking dews, and perhaps alternate rain and sunshine, and may it not when protected from them by this mode, be far superior for cattle to what we are at present aware of? Besides the advantages of grain, hay, and straw, being thus better preserved, and less expence of labour than by repeatedly turning in rainy seasons, there is another advantage of no small consequence, that the crops may be removed, and

put

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put on hurdles in another field, (without any hindrance to sheep feeding therein) when the land from whence they were taken may be immediately ploughed; for instance, after pease, to facilitate a better fallow, (than if delayed;) to be succeeded by wheat, and ploughing clover lays for wheat, and also preparing land for turnips after vetches, to accelerate the sowing; in which case, the delay of a few days has frequently occasioned a total loss of the crop.

It is an essential consideration, that the expence attending improvements, should not counterbalance their utility: and I flatter myself, there can be no objection to this mode on that score, because gate hurdles are useful appendages to a farm, in any county for other purposes, when not used on this occasion, and in this and other counties are requisite for dividing turnips for sheep; and, as to expedition, which is of great importance in harvest concerns, four of these hurdles (as I have already observed) may be fixed in five minutes.

If, therefore, the Society for the Encouragement of Arts, Manufactures and Commerce, instituted for the laudable purposes which it professes, should think my plan combines utility with cheapness and expedition, I should consider myself flattered by their approbation, and feel a degree of satisfaction in the reflection, that I have not turned my thoughts in vain to a subject which must be allowed to be of great importance.

I am, Sir,

Your most obedient servant,

W. JONES.

Pendown Hill, June 7th, 1810.

To C. Taylor, M. D. Sec.

SIR,

SIR,

I HAVE been favoured with your letter, acknowledging your having received my model of a temporary Rick, and recommending me to send certificates of its use.

I have to add, that the barley I had put on these hurdles last year, was done in my presence, by the same man who removed it afterwards to the barn, thrashed and sowed it; he is ready to attest my former statement, of the hurdles requiring only five minutes time to fix in the ground, of the barley preserved by them growing perfectly well, with a prospect from its present appearance, of yielding a good crop; and with this further remark, that it was so damp when put upon the hurdles, that he was apprehensive it would be spoiled, and was much surprized when he took it into the barn, to find it so perfectly dry.

I notice your query, whether these hurdles could not be applied to the purpose of temporary hovels for sheep, in wet weather? I think that if two of them were fixed eight feet apart, and two others placed on the top of them, covered with straw, reed, rushes, heath or furze, they would form a covered hovel of eight feet square, and afford great protection to sheep in wet weather, (particularly just after being shorn) and ewes in the lambing season also, if some that were the most forward with lamb, were selected and put into inclosures, where one end of each hurdle might be put against a hedge, or against a wall, or end of a hovel. These hurdles, covered in like manner also, would be useful, if a number of them, proportioned to the quantity of sheep, were put in the form of a square, in any part of a field, in hot weather, to afford shade. They would induce the sheep to lie there, and answer the purpose of folding,

as

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as they could easily be moved to such part of the field as wanted improvement, and be more at ease than when creeping under hedges, to the no small detriment of their wool.

I have to report to the Society, that I have this harvest made use of the hurdles on a larger scale, viz. to keep raking wheat separate from the sheaf, and which was too damp to put in sheaf; and also in small ricks of wheat for seed, to save the trouble of taking it from a larger rick, before the whole was wanted to be thrashed; and for my tithe wheat, that was not sufficiently dry to put into a barn.

I had also five acres of white pease, which were drilled where a crop of vetches had failed, so late as the 12th of May; they proved to be a very great crop, but they ripened so late, and the tops of the haulm were so green, from having shot out to an extraordinary length, that they were not all carried till the 27th of last month. At one time I almost despaired of ever getting them dry, owing to the heavy dews which fell during the night, and continued during most of the day, so as to afford but a few hours to dry my crop. I therefore took up six waggon loads from the middle of the field, on the 25th of last month, and put them on twelve gate hurdles adjoining each other, for the purpose of making one roof, and set the hurdles in the manner of my ricks. The first two loads were put on four of these hurdles at one end, which would contain four loads if necessary; the next two on the adjoining four hurdles; and the other two loads on the four remaining hurdles; so that though these three ricks were close to each other, yet being set up separately, they admitted air between each, from the bottom to the top, and yet adjoined sufficiently to make one continued roof to be thatched together.

When these six loads were removed from the field, I had room

room to turn the remaining parcels towards each other, and more towards the middle of the field, so as to have more air to dry. But they were not sufficiently dry till the 27th, when they were carried to another set of sixteen hurdles ready to take them, and each waggon load laid over the whole length of 16 hurdles, not being so damp as to require being carried up in separate ricks, as the former six loads. Some of these pease have been already thrashed, and prove to be in very good condition, as also the haulm, which is perfectly dry and sweet for cattle.

One of these ricks of pease, and probably some of the ricks of wheat, will not be taken in till the month of February next: they may therefore be inspected by any member of the Society, who may visit this neighbourhood.

I have inclosed a certificate from Mr. Waldron, a gentleman of this parish, who farms his own estate; and another certificate from Mr. Hewitt, also of this parish, who is esteemed a respectable and intelligent farmer: he rents a farm from Mr. Ware, brother to Mr. Ware of the house of Ware, Bruce and Co. London.

I am, Sir,

Your most obedient servant,

W. JONES.

Foxdown Hill, Oct. 30th, 1810.

To C. Taylor, M. D. Sec.

Certificates.

This is to certify, that I have seen some barley on Mr. Jones's farm at Culway, in the parish of Wellington, set upon gate hurdles in the harvest of 1809, which appeared to

to me to be a very good method to secure grain in wet seasons, or when the dews remain so long on the ground, that it cannot be got sufficiently dry to put together on other ricks. I have also seen a field of barley at Mr. Jones's this year, adjoining to my farm, sown with some of the barley put on those hurdles, which grows well, and is likely to prove a good crop; and I think this invention of public utility.

HENRY WALDRON.

THIS is to certify, that I have seen since this harvest, on Mr. Jones's farm at Foxdown Hill, in the parish of Wellington, three ricks of wheat, and two ricks of pease, set upon gate hurdles, which appears to me a very good method to secure grain in wet seasons, or when the dews remain long on the ground; that I have attentively examined those ricks, and consider it to be a public benefit that a farmer may have recourse to so cheap and expeditious a method of securing his corn in difficult seasons; whereby he is able to put it together sooner, and of course expose it less to the weather.

JAMES HEWETT.

Wellington, Oct. 30th, 1810.

SIR,

AGREEABLY to your request, I lose no time to give you the information you desire, respecting the temporary corn rick, and the size they may be made. The space between

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the two outside hurdles, contains about sixty sheaves on each side, or one hundred and twenty in the whole, to reach the top of the hurdles.

Every round of sheaves afterwards takes forty sheaves or upwards, say fifteen rounds high, which makes six hundred sheaves, and which will raise the rick about eight feet from the tops of the hurdles.

It will require about seventy sheaves from the top of the above fifteen rounds, to the top of the conic roof.

Four sheaves crossing each other, five times in the centre of the rick, will form in the whole twenty, making as follows:

120	Sheaves to the top of the hurdles.
600	Sheaves from the tops of the hurdles, to the commencement of the roof.
72	Sheaves in the conical roofs.
20	Sheaves in the cross or bonds of the rick.
812	Sheaves, or upwards of 81 shocks in each rick, which is more than the average produce of an acre.

The wheat in this part of the country is reaped near to the ground, and my sheaves this year, are about 4½ feet long, for which the distance of 3 feet 2½ inches between the outer hurdles, and 3 feet between the inner hurdles, is calculated. The distance should be regulated by the length of the sheaves of barley and oats. When shorter than four feet, the rick should be oblong instead of round.

Faggots of wood, placed at intervals within the rick, will be found particularly useful, where pease, vetches, clover, hay seeds

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seeds and meadow hay, are put into these ricks, as the faggots will promote a greater circulation of air.

The number of the cross sheaves, should be according to the dampness or dryness of the corn, either in every row, or every second or third row.

Reference to Plate 2, Fig. 1, the Section of Mr. Jones's Temporary Corn Rick.

The letters describing the same parts of the construction of the rick, agree with those in plate 1.

A B, being the two upright outside hurdles.

C D, the two inclined hurdles.

E E, the poles or sticks on which the sheaves are to be first placed on commencing the rick, and which cross the hurdles.

H H H H, the sheaves composing the body of the stack.

I I, the conical roof, the lower part of which projects sufficiently over the body of the rick, to cover it from wet, and in this roof, each round of sheaves are to be placed, so as to cover the ears of the sheaves below, and gradually rise to nearly a point, over which a bundle, containing two or three sheaves, with the butt ends upwards, and tied together, cover the centre or uppermost point of the rick.

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The Society are indebted to Mr. CHARLES WAISTELL, *of High Holborn, for the following valuable Communication and Improvement, on an Acorn Dibble in the Society's Possession. An Explanatory Engraving is annexed, the original Dibble is in the Society's Repository, and* Mr. WAISTELL'S *Drawing is preserved in their Library.*

SIR,

IN consequence of information that Government wanted intelligence respecting the best mode of dibbling acorns, I have made an improvement on the acorn dibble in the Society's Repository, which I presume will answer well the desired purpose. I therefore send herewith a drawing of it, requesting you will have the goodness to lay it before the Society of Arts, &c.

Thorn bushes and thickets are the natural guardians of young oaks from the depredations of cattle of all kinds, on forests and other grounds on which they pasture. By means of this implement, acorns may be deposited in the interior of bushes, as well as in open grounds, with rapidity and accuracy. And presuming that such an implement would be of great utility to many individuals, and also to Government, I wish much to have it made known as generally as possible among those who are most likely to profit by it; and which I think may be best effected by the Society of Arts, &c. giving an engraving of it in their next volume; provided they concur with me in thinking it may be the means of rearing an increased number of oaks, to promote which every possible facility should be given.

Permit

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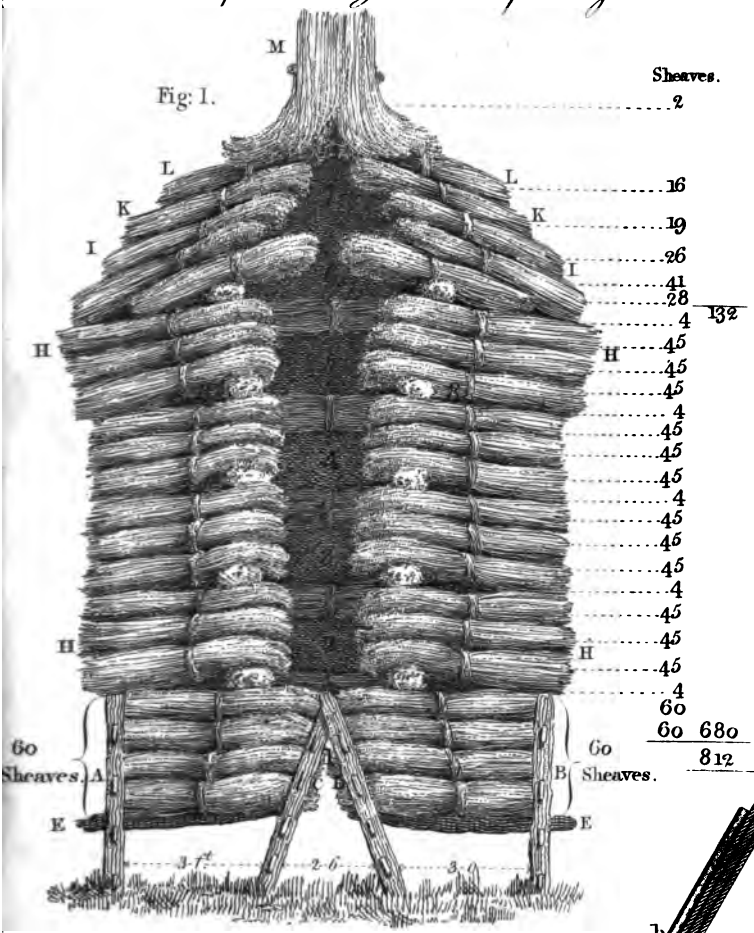
Section of Mr. Wm. Jones's temporary Corn Rick.



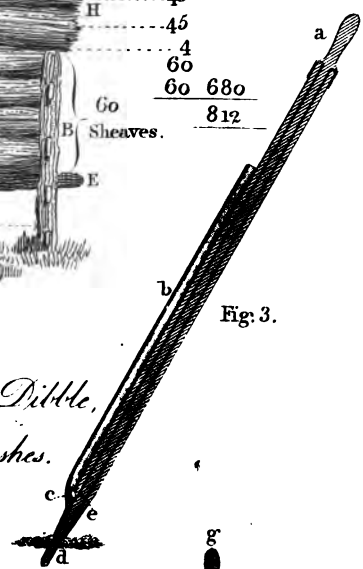


Fig: 3.

Mr. Waistell's Improvement on the Dibble, or Tool for planting Acorns in Bushes.

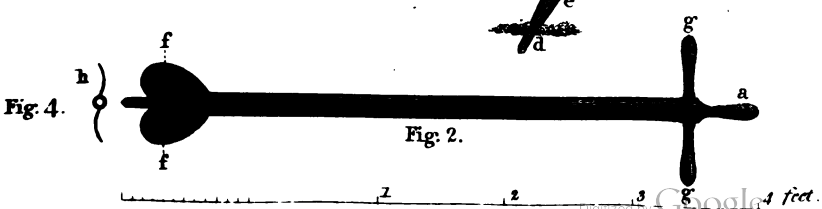


Fig: 2.

Drawn by J. Farey.

Engraved by S. Port

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Permit me on this occasion to observe, that many proprietors of landed property are not sufficiently aware that a greater or less proportion of almost every estate, would, if judiciously planted, pay the proprietor much more than the rent it could be let for to a farmer. It would, therefore, give me great pleasure to see in the Society's volumes more communications from successful planters. I trust there are numerous persons of this description who want only to be reminded, how greatly they might benefit individuals, as well as their country, by publishing, or communicating to you, such well ascertained facts of their success as planters, as they may be in possession of; and in order to direct their attention to the nature of the information that is chiefly wanted, I beg leave to refer them to pages 80 and 81 of the Society's 27th volume, wherein numerous particulars respecting the planting, management and produce of woods, are enumerated.

I am, Sir,

Your obedient servant,

CHARLES WAISTELL.

No. 99, High Holborn,
June 12, 1811.

To C. Taylor, M. D. Sec.

Reference to the Engravings and Section of Mr. Waistell's Improvement of the Dibble for Planting Acorns. Plate 2, Fig. 2, 3 and 4.

a represents the handle of the dibble, which dibble is a rod $\frac{3}{4}$ of an inch in diameter, moveable in the tube of a

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stave, which stave is externally about two inches diameter, *b* a tin or metal tube fixed on the exterior part of the stave, and of the same bore or aperture of the tube of the stave; when a hole is made in the earth by the point of the dibble *d*, the acorn is dropped down the metal tube, and on drawing up the dibble by its handle to the height of the letter *e*, the acorn *c* passes through a large opening into the dibble tube, and from thence falls into the hole made by the point of the dibble in the earth, when by moving backwards and forwards the cross handles *g g*, fixed on the top of the hollow stave, the soil surrounding the hole in the earth is loosened by the iron wings *f f* and deposited on the acorn. Fig. 4, *h* shows a section of the iron wings *f f* belonging to the bottom of the hollow stave.

Supposing that you wish to plant an acorn in the middle of any bush, you are to press the instrument through it into the ground, make a hole in the earth by the point of the dibble rod, then raise the rod above the hole where the two tubes communicate, drop the acorn down the tube *b*, which falls immediately through it and the lower part of the stave tube into the hole previously made by the rod, which hole is instantly covered by the soil raised by the wings. The dibble rod may be occasionally passed down the metal tube to be certain of its being perfectly clear.

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The THANKS *of the Society were this Session voted to* H. B. WAY, *Esq. of Bridport Harbour, for the following Communications on the Culture and Preparation of Hemp in Dorsetshire and on the Growth of Sea Cale.*

DEAR SIR,

As you informed me when you was lately in Dorsetshire, that the Society of Arts, &c. were anxious to obtain information concerning the culture and preparation of hemp in this neighbourhood, I am induced to send you some accounts thereof.

I fear my memorandums on the subject will not be worthy the notice of the Society, and I should scarcely have ventured to have put pen to paper upon it, if I had not uniformly found, that the persons who are concerned in the growth and management of that article, are shy of giving information. If what I have sent should induce persons equal to the task, to make the needfull enquiries in this county, Somerset, Suffolk and Norfolk, (which I believe to be the parts of England where hemp is most cultivated,) and make the culture more generally known than it now seems to be, I shall be much gratified. I hope, if you again visit this neighbourhood, to show you a very fine crop of wheat on the field where you last year saw the persons employed in collecting the male hemp; also another large field of exceeding good wheat, that produced hemp last year, neither of which have had any fresh manure upon them, since the hemp was taken from the fields. I have added some observations on the growth of Sea Cale: this

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useful vegetable, growing naturally on some of the Cliffs near Bridport Harbour, and being one of the most valuable esculent plants that I know, I have found the culture of it in the kitchen garden more easy to manage than has been generally supposed.

I have sent different specimens of the seed, and some of the natural soil, for inspection;

And remain, Dear Sir,

Your friend and obedient Servant,

H. B. WAY.

Bridport Harbour, March 1st, 1811.

To C. Taylor, M. D. Sec.

Account of the Culture and Preparation of Hemp in Dorsetshire.

Hemp is usually sown about the 15th of May, on the best arable land, on which about twenty cart load of good rotten dung has been spread, say about a ton to the load; this is well ploughed in, and the ground well ploughed two or three times, and well dragged and harrowed, to get the soil as fine as possible, and about two, or two and a half bushels of seed sown to the acre; what produces no seed, called by some male or summer hemp, and by others cinner hemp, is drawn about five or six weeks after the plant comes up, it is at that time in blossom; when drawn, it is tied up in bundles, and carried to some meadow land, and there spread to ripen: when ripe and dry, it is bundled and stacked. What stands for seed has no flower that can be discovered;

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discovered; it is the female hemp, and is generally ripe early in September, when it is drawn, bundled up, and stowed up in the field for the seed to dry and harden, when it is thrashed out in the fields. Most commonly in Dorset the seed is sold on the spot, at from 2*s.* 6*d.* to 7*s.* per bushel; an acre of hemp produces eighteen or twenty bushels. In Somerset they have sometimes thirty bushels of seed to the acre. In the sowing season I have known 21*s.* per bushel paid for seed; when thrashed the hemp is carried to the meadows, and spread to ripen as the other, and stacked in the same way, to prepare it for sale; it is sent to the houses of the poor in the parishes round which it is raised, to be what is called scaled, that is, each separate stalk of hemp is broken in the hand, and the hemp which is the outside rind or bark, is stripped off, in which state it is sent to market. The scaling is the employment of old men, women and children, and of the whole of the labouring family in the evening, as in winter they make but poor wages of it, and one principal inducement for them to do it is, that the woody parts of the hemp make them a fire, but it soon burns out. Complaints are made of a great deal of the hemp being often wasted from improper management, and want of care in the scaling of it; at the Comptons and Bradford, a good deal more hemp would be raised if they could get it scaled, which they find much difficulty in doing; and if it were possible to construct a mill that would swingle it at a moderate expence, on some such plan as the flax swingling mills, and to afford some encouragement to the erecting them, as well as flax swingling mills, it would encourage the growth of both articles materially; an acre of hemp in a good season will produce 14, 16 or 18 weights, of 32 lb. to the weight in Dorsetshire; in Somersetshire they reckon their weight two pounds less, and they sometimes

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times get as much as 35 weights to the acre; the price of the weight of hemp is from 16 *s.* to 20 *s.* per weight. The rotation of crops as follow:

On ground well manured,	Hemp.
	Wheat.
	Barley or Oats.
	Clover with the above.
	Wheat.
	Barley or Oats.
Ground well manured,	Hemp.

But sometimes they dress the ground well for hemp every third year. The quantity of hemp sown in Dorset, is very trifling in comparison to what is sown in Somerset. In the former it is chiefly confined to eight or nine parishes; whereas very large quantities are raised in Somerset, in the parishes of Misterton, Crewkerne, Hinton, St. George, Lopen, Seavingtons, Ilminster, Stocklinch, Donyatt, Kingstone, Shipton, Beauchamp, Barington, South Petherton, Martlock, Norton, Chiselborough, Stoke-under-ham, Mont-a-cute, Odcombe, the Chinniocks, the Cokers, the Comptons, Bradford, and a great many other parishes. Mr. Emanuel Pester, of Preston, near Yeovil, is in the middle of the hemp and flax county, and he can doubtless obtain and give every information that may be wished on the subject, being so extensively engaged in agricultural pursuits himself, and so competent to give that sort of information wanted; a Bounty of 3 *d.* per stone on hemp, and 4 *d.* per stone on flax, was for many years given by Government, but is now discontinued; it was paid by the Clerk of the Peace for the counties, and as the late Mr. Wallace managed that for the county of Dorset uncommonly well, it is most probable that a very

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very correct return for the county of Dorset could be obtained from the office of the Clerk of the Peace for this county, of the quantity raised each year of both articles, during the continuance of the Bounty; also from Devon and Somerset similar returns could be got. There are large quantities of hemp raised in Suffolk, the writer thinks, near St. Edmunds Bury and Stow market, in that county. He has been told they make linen so fine of hemp, as to be worth 5 *s.* and 6 *s.* per yard; and used for shirts in preference to Irish, being considered much more durable and better, so much so, as to induce the Irish to imitate the fabric, and stamp the cloth, Suffolk Hemp. It is also raised in Norfolk, in the neighbourhood of Lynn and Wisbeach, but it must be watered and prepared in some other way; indeed he is convinced that all the hemp imported from the Baltic, is prepared differently from the mode used in Dorset and Somerset, and must have been swingled before it was sent to the different ports it was shipped at for this country. The giving the former Bounty on the growth, and increasing it on hemp and flax, would encourage the growth, but if given on the number of acres sown, the grower, as his ground would be in high order for a crop of turnips and wheat after, might be careless about his crop of hemp, as the Bounty to be worth notice, must be worth more than the value of the seed in common years and the labour of sowing.

Hemp in this county and the next is never sown in new ground fresh broke up, but flax always by choice, when fresh ground can be got. Mr. John Pitfield is going to break up great part of the West Clift at Bridport Harbour, and sow it with flax this season. The writer, while on the subject of hemp, is led to mention, that when travelling in the

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the year 1792, in the province of Massachusets near Boston, in North America, was assured that considerable quantities of hemp were raised in the township of Sunberry, about ten miles from Boston, and that it was always raised on the same ground every year, no other crop being sown in their hemp lands, and that it was manured every year, at the rate of about ten tons of manure to the acre of hemp. Respecting seed, he cannot learn that there is any for sale at Bridport, with the buyers who purchase it up for the growers at the hemp harvest, and he expects that very little can be got from the growers round here. Somersetshire is a more likely place to get it, as he has known some of the hemp farmers to have upwards of an hundred acres of hemp in one season; round this they generally are only in a small way. A change of hemp-seed is much wanted in Somerset and Dorset. Trials have been made two or three times to get it from Russia, but it is not possible to get new seed from the interior early enough in the fall at the shipping ports, and some old seed which has been shipped has not answered the purpose; if new could have been got, it would as generally have been used for a change, as the new Riga barrel flax seed is by the flax-growers. As the seed sown in Russia was considered a good sample, and its appearance much liked, possibly it might, at a future period, be obtained in the fall from Odesea, or some other port on the Black Sea, as it is understood that a good deal of hemp shipped at Riga and St. Petersburgh, grows much nearer to the Black Sea than the Baltic; or possibly the seed of the Italian hemp raised in the neighbourhood of Bologna, or that of America, might be obtained in time to answer. Perhaps tares, called by some vetches, might be cleared from the ground early enough for manuring and sowing the ensuing crop of hemp, and

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and vetches might make it worth the farmer's attention; to this an objection was stated, which I do not just now remember. On talking with the gentleman before-mentioned, and stating the American practice, with what had passed on it with my neighbours, he said, he had long been persuaded that it was a good practice, and that he had the last season a very good crop of hemp on a piece of ground that had hemp the year before, and that he did not let the hemp stand for seed, but had it all down at the usual time for drawing the summer or male hemp, and the ground immediately sown with turneps, which were fed-off with sheep, and the ground then slightly manured, and hemp sown again at the proper season, and that he had then, October 27, 1808, a piece of turneps after his hemp, which were worth 6 *l.* per acre. It is to be observed, that the acre here meant is the British acre of one hundred square poles, three hundred and four square yards each. The manure mostly used for hemp is good rotten stable dung, which is much preferred to any other, though lime is frequently used; but manufacturers pretend to assert, (with what foundation I cannot say), that they can distinguish a material difference in the quality of the hemp, where lime has been used instead of dung, as from lime they say hemp is more harsh and brittle, and not of such a soft silky quality as where dung has been used. The writer has endeavoured to throw together every thing that occurs to him on the subject of the culture of hemp, which, from being born and residing great part of his life in a part of the county where it has been extensively cultivated for ages, he has been able to collect; but where it is not very easy to obtain direct information, as both the growers and manufacturers are very shy of giving any, under an idea that it might injure their own interest by assisting to extend the

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the culture to other countries. He believes that his statement may be depended upon, but he is no farmer, and therefore the loose hints thrown together here on the subject may not be so clearly and satisfactorily explained as he could wish, but if they in the smallest degree assist in encouraging the growth of an article so essential to the welfare and prosperity of the kingdom, it will afford him the most heartfelt pleasure.

H. B. WAY.

Account of the Culture of Sea-Cale, or Sea-Kale.

THE mode which I consider the best for the culture of sea-cale, is to draw lines in a very dry soil and dry situation, on ground with a southern aspect, about two feet one way by about eighteen inches the other, and where the lines cross to put in three or four good perfect seeds in a square or triangle, about three inches apart; this may be done any time in November or December in open weather, and it will require no other care afterwards but keeping the ground clear from weeds till the autumn of the following year, when all the plants but one of the finest in each square may be taken up, which if wanted will serve to form other beds set the same distance apart. The ground in the intervals of the plants should be dug in the spring and fall of the year, taking care not to injure the plants. The leaves should be left on the plants till they fall off naturally, which will not in general be sooner than the latter end of November. In the autumn

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autumn of the second year the same attention should be paid to the plants, and to remove the dead leaves.

In the third year, about the middle or latter end of November, when the leaves have been cleared away, and the ground dug, each plant should be covered over close with a tub, pan, a heap of small stones, coarse cinders, or coarse bark, raised about ten or twelve inches over the crown of each plant, and from about the latter end of February to the latter end of March the plants will be very fine and fit for use. I prefer that which has been bleached with our round sea-gravel, about the size of large peas or beans, to any other mode whatever. The plants should be cut but once in a year, as cutting it oftener weakens and lessens the size of the plants. If it is not desired to have the plants large they may be bleached and cut a year sooner.

I have sent a specimen of the sandy soil in which it grows naturally here, as I think the generality of gardeners are too careful, and manure the ground too highly for it. In the month of April last, after cutting my plants, I covered the ground all over, at least six inches above the crown of the plants, with this earth, they soon shot up through it, and never looked finer or produced a larger quantity of good seed than that year.

I am thus particular in order to show that this vegetable will succeed as well, if not better, in poor ground than in rich, provided the soil be dry, and care taken in the management; I speak from long experience, having been well acquainted with the management of this valuable plant from my youth. When I cut the sea-cale for use, I immediately draw up the earth with a trowel, so as completely to cover the whole of the plant; this I fancy makes them grow more luxuriantly. This plant, if properly managed, is superior to asparagus

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asparagus, and if more is cut than wanted for immediate use, it will keep for some days in a pan of cold water, but of course it cannot be better than when recently cut. It precedes the use of asparagus, being ready for the table in February and March.

H. B. WAY.

PAPERS

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PAPERS

IN

CHEMISTRY.

The SILVER MEDAL *of the Society was this Session voted to* H. B. WAY, Esq. *of Bridport Harbour, for his Method of preparing a cheap and durable Stucco, or Plaster, for outside or inside Walls. The following Communications were received from him, and Specimens of the Stucco, and of the Sand from which it was made, are preserved in the Society's Repository.*

SIR,

IN consequence of your expressing an opinion that a general knowledge of my method for preparing a stucco, or plaster, for outside walls of houses much exposed to sea breezes or bad weather, would be of service to the public, I have inclosed an account of the process, and I will with pleasure furnish any further particulars of this business for the Society of Arts, or permit any gentleman to examine it who

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may wish for more information on the subject. You know the situation of my house, which is greatly exposed to the spray of the sea and bad weather; and I can truly add, that by means of this stucco it is perfectly free from damp, and the plaster remains compact and durable.

I remain, Sir,

Your obedient humble servant,

H. B. WAY.

Bridport Harbour, Oct. 12, 1810.

To C. TAYLOR, M. D. SEC.

To make a strong Stucco, or Mortar.

Three parts Bridport Harbour-sand to one of lime, both finely sifted, and mixed with lime-water; if used as stucco, the first coat to be laid on half the thickness of a crown-piece; let it remain two days, then with a painter's brush wash it over with strong lime-water, and lay on the second coat of the same thickness.

1805, March 25.—Measured a coal half-bushel of Beamister lime, and put it into a hogshead of water, to make the lime-water.—Measured two coal half-bushels more of the lime, slacked and sifted it, it then measured three half-bushels, to which were added nine coal half-bushels of Bridport Harbour-sand well sifted; I saw it well mixed up with lime-water, and thoroughly worked together; the next day saw it turned, and again mixed up, that it might be well incorporated together.

27th.—This morning had a fine coat of it laid on the west end of my large storehouse at Bridport Harbour.

29th.

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29th.—Had it washed with lime-water, and a second coat laid on.

Cost.

	s.	d.
One sack and a quarter of lime, at 2*s.* 6*d.* -	3	1½
Two men and one boy two days each, fetching and mixing up materials, and laying on; men 2*s.* 3*d.* per day, boy 10*d.* per day, and one pint of ale each per day, 12*d.* - - -	11	10½
	15	0

N. B.—I suppose the expence rather over than under-rated.

May 11.—This day Thomas Everett measured and examined the work, found it hard and sound, 24⅞ square yards, a little done to the house, suppose the whole to be twenty-five yards square.

Twenty-five square yards at 7½*d.* per square yard, would be 15*s.* 1¼*d.*

June 13, 1806.—Examined the work, which was perfectly sound and free from cracks, nothing having ever peeled off from it. The situation exposed to the weather in the greatest degree.

N. B.—The coal half-bushel above-mentioned holds exactly thirteen gallons wine-measure.

H. B. WAY.

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SIR,

I WAS favoured with yours of the 18th instant, and I now enclose the mason's certificate of the quantity of stucco done with the composition I gave him the particulars of, in addition to which it may be necessary to mention that the coal half-bushel, with which the ingredients of the composition were measured, (according to the account formerly given,) contains exactly thirteen gallons of water, wine measure, and would hold exactly 1 cwt. 1 qr. 7 lb. net of the sand used; the weight of the lime I do not know, and my being able to ascertain exactly the weight of the sand, arose from my waggon being employed to carry what was used at Yeovil and East Coker, from hence and for what I sent to Yeovil, I was paid 1 *s.* 9 *d.* per cwt.; from the sand here succeeding so well, Thomas Everett would not be prevailed on to engage to do any of that sort of work with hill or river sand, to be got on this shore. The work he did for me was all by the day; what he did at Yeovil and East Coker he agreed for at eight pence per yard, of nine feet superficial measure for labour only for the two coats, at four pence per square yard for one coat, all the materials being brought to the spot at his employer's expence, and who also found scaffolding and scaffold ropes; this, I think, is considerably higher than by my calculation of the expence of what I had first done he ought to have charged; but its being done at a distance of twenty miles from where he lives, and in the most busy time of the year for masons work, I suppose must account for it in the first instance, and having once made that price, he would not now work under; but I believe, for a considerable building, and with sufficient notice, and being allowed 6 *d.* per mile in lieu of wages and travelling expences for himself

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self and an assistant, out and home, he would go to any part of the kingdom, on being paid 8 *d.* per yard for the work. It has been the general received opinion here, that plaster made with sea sand, unless well washed in fresh water, would be always damp, but, on the contrary, I find from what has been done in my dining-parlour and passage, it has been always quite dry, although the whole of the sand with which it has been done has been thrown up by the sea, and must have been always at spring tides covered with sea water; indeed, it sometimes happens that, for months together, there is none to be collected on our shores at this place, that Everett thinks fine enough for the purpose, and as I am now and then applied to for getting it, I have lately, when my horses were at leisure, got a small quantity collected and hauled in for my own use, or, in case of its being wanted, I charge 2 *d.* per cwt. for it, where it is deposited. As I design at some future time to make some alteration in the passage done with the stucco in April 1806, I had four pieces taken off, which I tied up separately, each in a piece of brown paper, and had them packed in a box, with a layer of sand between each piece, and at the bottom and top of the box, and directed it for you, and sent it with some goods I shipped on Saturday last to my friend Netlam Giles, Esq. No. 2, New Inn, St. Clements. I have requested of him that he will have the goodness on its arrival to forward it to you. The vessel it goes by is the sloop Mary Anne, John Anning, master, bound to Dounes Wharf, Hermitage, Wapping. It is possible that the pieces of stucco sent may imbide some of the saline particles from the sand it was packed in, but this did not occur to me at the time, or they should have been packed in saw-dust, as they were perfectly dry when packed, so much so as, when struck upon with the knuckle, to give a sound similar to what an earthen vessel would do if dry and not

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cracked. Should there be any further information requisite, on your letting me know, it shall immediately be sent you. It had almost escaped me to say, that the small quantity of six yards, done last October with stone lime for trial, was done from your intimating to me, when I had the pleasure of seeing you in Dorsetshire, that stone lime was likely to answer; but it would I think look better if white-washed; the difference in point of expence is materially in favour of the stone lime. The cost of my waggon-load of it at the kiln, about a mile from hence, would be only 10 *s.*, whereas about the same quantity of chalk-lime at the kiln, full eight miles frome hence, would cost 1 *l.* 4 *s.*, and I cannot get any chalk-lime nearer. I have only now to add that I am, very respectfully,

Sir,

Your obedient humble servant,

H. B. WAY.

Bridport Harbour, April 22, 1811.

To C. TAYLOR, M. D. SEC.

CERTIFICATE.

I hereby certify, that Mr. H. B. Way, merchant, of Bridport Harbour, in the county of Dorset, in the month of March 1805, gave me the necessary directions for making a strong cheap stucco or plaster, which was composed of one part chalk-lime, and three equal parts of fine sand, collected on the sea shore, near Bridport Harbour, the whole of which was mixed up to a proper consistence with a strong lime water, and I have since that time done the annexed work with the said composition.

Date

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Date.	For Mr. H. B. Way, at Bridport Harbour.	Yards.	Yards Flat Measure.
1805. March.	On the outside of a warehouse wall, part rough stone and part brick.	25	
1806. April.	On the inside walls of a passage in his dwelling-house, on rough stone.	10	
October and November.	On the inside rough stone walls of two cellars.	224	
	One coat on the ceilings of the said cellars. N. B. The first coat on the ceilings was common hair mortar.	228	
1807. April and May.	The whole of the outside of his dwelling-house, rough stone walls.	335	
August.	On one side wall of the dining-room in brick; this stucco was rubbed down quite smooth, and has since been painted with oil colours.	13	
1810. October 10.	On a rough stone wall of a warehouse directly fronting the sea, and not two hundred yards from it, with common stone-lime, such as is used for manure in this quarter by way of trial.	6	
			821
1811. April.	At Mr. H. B. Way's request, I have this day carefully examined the whole of the above work, and I find it sound and good, and by his directions, four pieces of the stucco were taken off from the passage wall, (which was laid on April 1806,) and packed in the same sort of sand as is used in the composition, and sent by him directed for the Secretary of the Society of Arts, Manufactures and Commerce, London.		
	For Peter Daniel, Esq. of Yeovil, Somersetshire.		
1808. May and June.	On the outside brick-walls of his dwelling-house there.	430	
1810. May and June.	On the outside brick-walls of other dwelling-houses there, for W. Hellyer, Esq. of East Coke, near Yeovil.	480	
			910
1809. June.	On the outside brick and rough stone-walls of his dwelling-house, at that place.		1040
	For the Rev. Joseph Fawcett, of Yeovil.		
1810. June.	On the outside rough stone-walls of his dwelling-house there.		212
	N. B. Mr. Fawcett's house being built the year before, with a view to being stuccoed, the walls were left rough.	Yards.	2983

I hereby

I hereby certify, that the whole of the foregoing two thousand nine hundred and eighty-three square yards of stucco, were done with the before-mentioned composition, by me and my men under my directions, and I verily believe it is the cheapest stucco known, and that it will prove very durable, both without doors and within, and that it has given entire satisfaction to the gentlemen who have tried it; and I am now engaged, if I can the ensuing summer, to stucco the outside of one house at Bridport, and another at Yeovil, also the inside of a cottage for labourers that I have just built for Mr. H. B. Way, at Bridport harbour.

THOMAS EVERETT.
Stone Mason, Bricklayer and Plasterer.

Shipton George, near Bridport,
Dorset, April 22, 1811.

Witness, JAMES BUDDEN.

PAPERS

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PAPERS

IN

MANUFACTURES.

In Page 109, *of the* 28*th Volume of the Society's Transactions, will be seen a Communication from Mr.* EDWARD SMITH, *of Brentwood, on manufacturing a variety of Articles from the Fibres of the common Nettle, for which he has received their* SILVER MEDAL; *he has since, with great attention and laudable Industry, extended his Experiments on this Subject, and, during the last Session, produced to the Society Specimens of Cloth and Cordage made from the Nettle, which appear to possess great Strength and Durability. The Society have, therefore, this Session, voted to him their* SILVER ISIS MEDAL. *The following Communication was received from him, and Specimens of the Cordage and Cloth made by him from Nettles, are preserved in the Society's Repository.*

ESTEEMED FRIEND,

I RECEIVED thy kind favour of the 23d instant, by the contents of which I am much obliged, and being impressed by

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by the consideration of the vast importance the introduction of a new substance of productive labour would be of to the community of this manufacturing country, particularly as affording a new source of industry to the increased numerous poor of both sexes, in truth, so operated on my mind, as to create a great unwillingness to suffer any exertions consonant with my limited powers, from total disadvantages, to lay dormant: I am, therefore, very desirous by unremitted endeavours to be instrumental in disseminating the knowledge of, and the means of bringing into use, so valuable a spontaneous production as the common nettle substance, under the sanction and through the medium of the enlightened Society of Arts, &c. These considerations, aided by the hope of obtaining their further approbation, have stimulated me to persevere in my attempts to contribute all in my power towards the advancement of so desirable and beneficial an object, in the expectation that when all the different fabrics which that substance is capable of being converted into, are produced, it may have a greater tendency towards encouraging others to embark in a manufactory thereof, than volumes written on the subject. With these sentiments, I am induced to trouble thee farther, in requesting thou will be so kind to favour me by laying before the Society the different specimens of manufactory from the nettle substance, which I have at present in readiness, and which will be sent to thee by the Brentwood coach, which inns at the Blue Boar, Aldgate, and I expect will be delivered soon after the receipt of this. The cordage Nos. 1 and 2, is affirmed by the cord-spinner to be of equal strength to that made from hemp. The cloth No. 1, is rough from the loom; No. 2, the same fabric half bleached; and No. 3, which I ordered to be *Huckaback*, also is only half bleached for want of sufficient time for the process. The quality

quality of the cloth hath suffered throughout, by the negligence or willfulness of the manufacturer, and is principally owing to the raw material having been only passed through such heckles as are used for the coarse part of the hemp manufactory;—other necessary operations were omitted, in consequence of my instructions not being attended to by the persons into whose care it was entrusted. He resides in the country, at a great distance, and his capability and integrity proved greatly inferior to the opinions I had entertained of him; and it now appears his practice is confined to the coarser part of the hemp manufactory. It was my intention to have produced with the above a pair of stockings, manufactured on the principle of cotton, and also a specimen of fine cloth on the same principle, with a view to shew the great extent of contrast; but, on application to a cotton spinner, I found the quantity of material I had in a state of preparation suitable was not sufficient for the operations of carding; in consequence I am obliged to postpone my designs till I am enabled to prepare a sufficiency. Greatly desirous of contributing to the accomplishment of the object in view, and sensible how much the sanction and approbation of the Society would tend to promote it, I hope they will consider my continued exertions worthy their farther attention. Anticipating their approbation, I remain,

Very respectfully,

Thy Assured Friend,

EDWARD SMITH.

Brentwood, the 26th of 3d Month, 1811.

To C. Taylor, M.D. Sec.

Ten

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TEN GUINEAS *were this Session voted to Mr.* JOHN ROBERTSON, *St. Mary's Wind, Edinburgh, for an Improvement in Machinery for Weaving Tartan or Plaid Hose. The following Communication was received from him, an Explanatory Engraving is annexed, and a Model of the Machine, and Specimen of the Work, is preserved in the Society's Repository.*

MUCH RESPECTED SIR,

THE highly honourable and useful Society for the Encouragement of Arts, Manufactures and Commerce, with which you are officially connected; and from a former instance of their and your attention to me, emboldens me again to call their discriminating taste and judgment to the inclosed draught and description of a machine, for the more expeditious working of Tartan Hose on the stocking frame, as also one done by the invention;—an article essentially necessary in the *Highland garb*, the dress of the *Conquerors of Egypt*, and the more than *match* for *French Invincibles!* Tartan, or diamond hose, from the present tedious manner of working so many threads, (eleven in number) and although the hose are not much above one half of the length of common stockings, yet they are rated to the workman at the price of two pair of hose of the same gauge on the same frame; therefore it gives me much pleasure to send you an invention that will facilitate the operation, and save more than half of the time formerly taken; consequently it will prove of great advantage to that part of the community of Scotland who use that dress; besides,

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Mr. John Robertson's Machine for weaving Tartan.

Fig. 2.

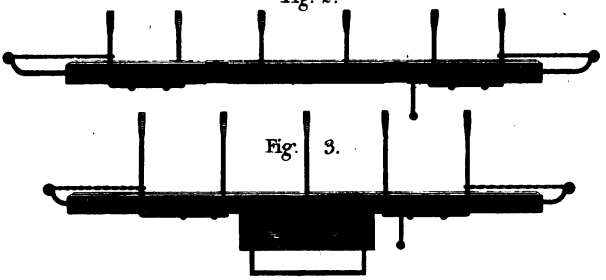
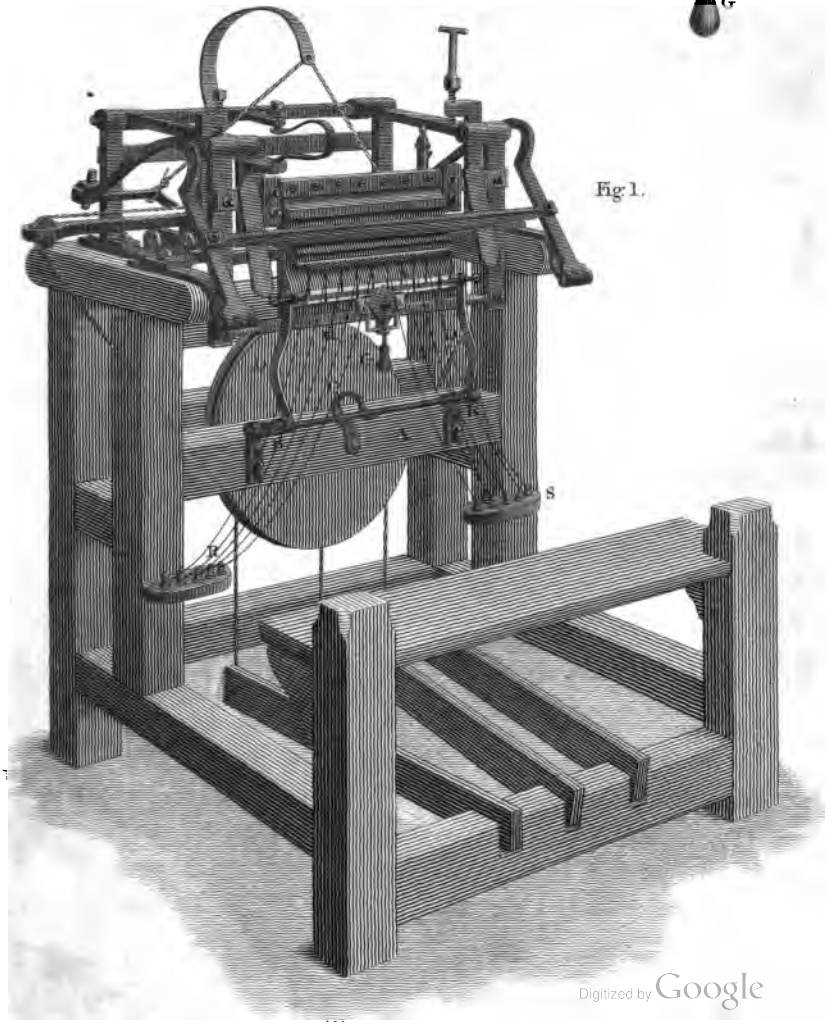


Fig. 3.

Fig. 4.

Fig. 1.



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Drawn by J. Farey.

Engraved by S. Porter.

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besides, the machine will also prove of use in fancy work of different designs, for by it the diamond may be made from a quarter of an inch to two or more inches square, and of any guage of a frame, although the pattern hose is coarse, it being done on a twenty-four inch guage frame that I put the machine to.

I have only further to observe, as will appear upon the Society's investigation, that the invention is truly simple, and the expence of the machine, independent of the stocking-frame, will cost but a mere trifle. Your communicating to me the result of this application, will oblige,

Much respected Sir,

Your most obedient,

and very humble servant,

JOHN ROBERTSON.

St. Mary's Wynd, Edinburgh,
March 8th, 1809.

To C. Taylor, M. D. Sec.

Certificates.

We have examined Mr. John Robertson's invention, and we are happy in declaring that it deserves encouragement, as the machine in operation will save a great deal of time in making tartan hose.

James Baird, Hosier.

David Yair.

William Vair, Stocking-frame Smith.

Edinburgh, May 6th, 1809.

Explanation

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only the space of one needle; in this position the diamonds produced by the threads of the upper slider will be at their greatest breadth, while those of the lower are only the points of the diamonds; every succeeding stroke the machine makes, the upper slide must have its motion diminished the space of one needle, and the lower one increased in the same degree, because the diamonds produced by one are widening, and the others narrowing; this continues till the lower slide moves the whole breadth of the diamond, as the upper one did at first setting out, and then the action is reversed: the upper one being on the increase till it gets to the full width again, when a diamond will have been completed. This variable motion of the two sliders is regulated by a square, shewn in fig. 4, exactly the same size and figure as the diamond; this is situated as shewn in fig. 1, and the sliders have pieces projecting from them, which stop against the egdes of the square, which is moved every course, by turning the screw G, one turn in its socket, which is connected with the bar E. By this means the reader will see that the movement of the sliders will be as above stated; the screw must have twelve threads per inch for a stocking-frame of a twenty-four inch guage, then there will be twenty-two leads, or forty-two needles, in the widest part of each diamond, which will be $1\frac{6}{8}$ across; for a thirty inch guage, the screw must have fifteen threads per inch. The outside guide of both sliders do not partake of the motion of the sliders, because they are to produce the selvedges of the hose; making half diamonds, which become whole ones when the stocking is sewed; these guides, as at first explained, are not fixed to the sliders, but have a sliding movement endways, the springs always drawing them out, and they are stopped by the ends of two screws, attached

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tached to the ends of the bar E, as may be seen in fig. 1; these screws being turned, will adjust the selvage needles, as is required for the breadth of the hose, and for narrowing it when it comes to the small part of the leg. By this machine, the whole of eleven threads may be laid upon the needles, in the same time that two could be done in the common way, and without necessity of counting the needle, to increase and diminish the different coloured diamonds.

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PAPERS

IN

MECHANICS.

The SILVER MEDAL *was this Session voted to Captain* T. M. BAGNOLD, *of the Royal Marines, High Row, Knightsbridge, for his Invention of a Gun and Carriage, to clear the tops of the Enemy's Ships from Marksmen in close Action. The following Communication was received from him, an Explanatory Engraving is annexed, and a Model of the Gun and Carriage, are preserved in the Society's Repository.*

SIR,

I HAVE the honor to transmit you a model of a gun and carriage, invented by myself for the purpose of protecting our naval officers, from the enemy's marksmen in close action, and a paper, descriptive of it, which I beg the favor of you to lay before the Society, and which, considering

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the end proposed, I trust they will deem not altogether undeserving their notice.

The melancholy loss sustained by the navy, by the death of Lord Nelson, who fell by a marksman in the enemy's top, first suggested to me an idea of a carriage, which, by scouring the tops of an enemy in close action, would greatly diminish the loss among our officers and men quartered on the upper deck, and greatly injure the enemy's running-rigging, in a part where many material ropes are of necessity collected.

I am, Sir,

Your obedient humble servant,

T. M. BAGNOLD.

7, *High Row, Knightsbridge,*
March 12th, 1811.

To C. Taylor, M. D. Sec.

Description.

The lower part of the model is made to represent part of the deck of a ship of war, either gangway, poop, forecastle, or quarter deck, on which the carriage traverses round a bolt, which passes through a beam and forelocks in the carriage. As the hole through the beam for the bolt might weaken it, it might be passed through a piece of elm or oak between two beams, and thus rather strengthen than weaken the frame.

The construction of the carriage will explain itself.

The gun is elevated by a rack and pinion, and may be retained

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Captain T. M. Bagnold's Improved Gun and Carriage.

Fig: 1.

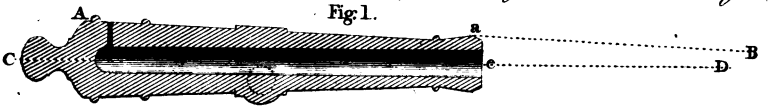


Fig: 2.

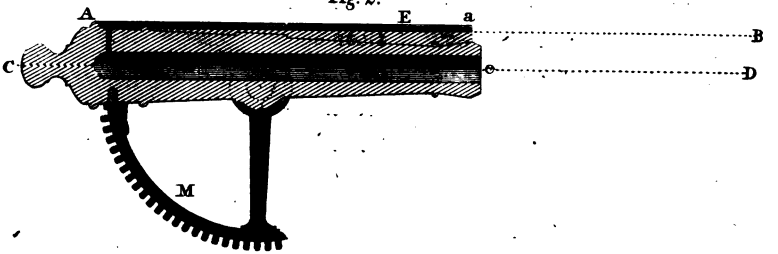
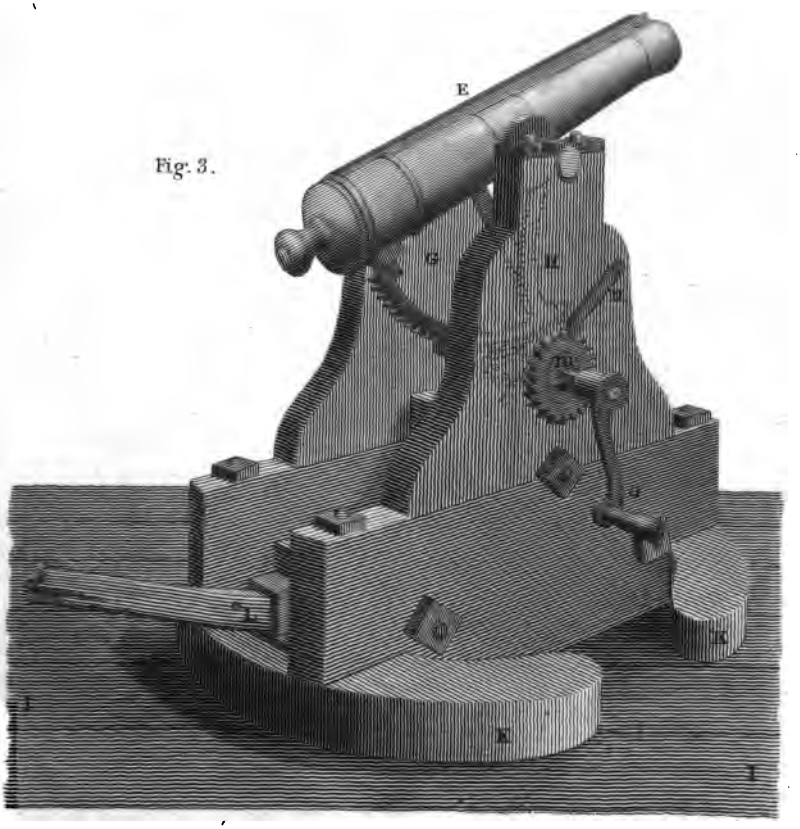


Fig: 3.



Drawn by J. Ferey.

Engraved by S. Porter.

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retained in any position by the tooth-wheel, and catch on the right cheek of the carriage.

Firing in the navy is rendered *uncertain* and *incorrect*, by the roll of the vessel altering the elevation; and as it is impossible for the seamen to keep his eye for the elevating sight, and directing one at the same time, I have endeavoured to remedy the defect, by placing a bar of brass on the top of the gun, which, by correcting the difference of diameters at the muzzle and breech, renders the lines of flight and sight parallel to each other at one view, and therefore reduces the necessity of two sights to one, and enables the seaman to keep his eye on his object till the moment he fires, in this instance particularly necessary; on the upper surface is a groove, similar to that on a double fowling-piece, which renders the aim of the gunner, at the short distance this gun will ever be wanted for, an absolute and rifle-like certainty.

Mode of Firing.

In firing a common long nine-pounder, eight men are usually required; whereas, two men and a boy are sufficient for this gun. One points, primes, fires, and stops the vent; the other sponges, loads and winds up; the boy supplies ammunition. The man who fires, directs the gun by the handspike, and keeping his eye along the sight, orders the man who winds the gun up when to stop, and fires directly at his object, by means of the lock string; and as the gun has no recoil, the marksman safely keeps his eye to it till he fires, and with a little experience may strike a small object with the greatest certainty.

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It may be objected, that the carriage could not stand the explosion without being allowed a recoil.

I answer, when this gun is used, it will be at *very close quarters*, and at a *very great elevation*, at 60″ or 70″; consequently the recoil is nearly downwards, and as cannister shot will be the best on these occasions, from four to eight ounces of powder will be a very full charge for one hundred and forty musket balls; more would only scatter them, and spoil the effect, particularly as one hundred yards is the greatest distance it will be ever wanted; for if the gun should be bored with a chamber, on the carronade principle, less would do, as in those guns, from one-twelfth to one-sixteenth of gunpowder, in proportion to the weight of the shot, is all the powder allowed for long ranges. And by lining round the head of the carriage with strong plates of iron, which passing under the arm of the gun, should be bolted together through all; the carriage would be rendered sufficiently strong to bear any explosion whatever. I tried the experiment on a brass twelve-pounder, in a frame work carriage, and found a satisfactory result, and saw, in the lines off Flushing, two brass twenty-four pounders on a construction something similar. Should brass be objected to on the score of œconomy, I answer, iron would do as well, and a short gun as well or better than a long one. As the carriage is put together with screw bolts, it may, in case of necessity, be taken to pieces and put below.

T. M. BAGNOLD,
Captain Royal Marines.

Reference

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Reference to the Drawings of Captain T. M. Bagnold's improved Gun and Carriage. Plate 4. Fig. 1, 2, and 3.

Figs. 1 and 2 of this plate shew the difference of the common ship's gun, with the improvements before us; in fig. 1, which is the common gun, the line C D is the axis or central line of the caliber of the gun; and A B is the line of sight by which it is pointed; this line, which touches the largest part of the breech at A, and the muzzle at *a*, is not parallel to the line C D, which is the flight of the shot, because of the greater thickness of the gun at its breech; this obliges the gunner to employ two lines of sight; the one A B, which is on the top of the gun, he uses to point the gun in its horizontal direction; and another line by the side of the gun, and therefore in the same plane as C *c*, he uses to give it the proper elevation. To avoid the necessity of thus recurring to two sights, Captain Bagnold has applied a brass bar E, figs. 2 and 3, upon the top of the gun having a groove along it, which is exactly parallel to the line of flight, as shewn by the dotted lines, (to which the same letters apply as for fig. 1,) and being also parallel to it in the horizontal direction, it serves to point the gun at one observation.

Fig. 3 explains the construction of a carriage for this gun, G H are the two cheeks made of very strong plank, and united by cross pieces and strong bolts; the lowest of these pieces, which is in the centre of the frame, has a hole through it, to receive a very strong iron bolt which is fastened into the deck, I I; and upon this bolt the gun and carriage traverses horizontally; K K are two curved pieces of timber fastened to the cheeks G H; these resting upon the deck, cause the carriage to stand firmly; it is turned about by the

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handspike L, to direct the gun horizontally; to give it the requisite elevation, a quadrant M, fig. 2, is fixed to the two trunnions and the breech of the gun; and having teeth on its circumference, is moved by a pinion (shewn dotted in fig. 3,) fixed on an axis, passing through the two cheeks of the frame; on the end of this, a ratchet wheel *m* is fixed, and a click *n* holds it up: the pinion is turned round by a winch *o*, which affords the means of elevating the gun with the greatest ease and accuracy, to point to any object by the sight E; the carriage must be framed with the greatest strength to resist the recoil of the gun, which will act much more powerfully upon this than the common gun-carriage, because it cannot run back when fired.

The following Certificates were produced.

From ADMIRAL E. HARVEY, stating that he had examined Captain Bagnold's model of a gun and carriage, and that a gun for this purpose is a desideratum in the service, particularly when the marksman can fire without previously moving from his aim, and thereby avoid the uncertainty that would otherwise result from the motion of the two vessels.

From ADMIRAL Sir ROGER CURTIS, stating that he had inspected Captain Bagnold's model, and is of opinion that if the gun and carriage is made transportable, for being fired from various situations as may be found necessary, that a gun so mounted would in close action be very useful for the purpose for which it is intended; and that several Naval Officers to whom he had shewn it expressed the same opinion.

From

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From COMMODORE I. ROWLEY, stating that he had examined the drawing and model of Captain Bagnold's gun, for dislodging marksmen from the enemy's tops in close action, and had shewn them to several of his brother officers, who agreed with him in opinion of it being likely to answer that intention; and that the proposed object is no doubt of considerable importance in an engagement at sea.

From CAPTAINS Sir ROBERT LAURIE, W. M. COURTENAY, KEITH MAXWELL, JOHN RICHARD LUMLEY, and M. HEAD, all of the Royal Navy, stating that they had examined the model of the gun and carriage, invented by Captain Bagnold, for clearing the enemy's tops of marksmen in a close action, and are of opinion that it is well calculated for that purpose, would be highly beneficial in its effects, and appears to them better constructed to answer its end with precision, then any thing of the kind yet invented.

From LIEUTENANT CHARLES HOPE SMALL, of the Royal Artillery, stating that he had examined the model of a gun and carriage, invented by Captain Bagnold, for the purpose of dislodging marksmen from the enemy's tops in close action. That as the elevation in this case must be great, and the distance small, the charge of powder for carrying grape or cannister shot will be very trifling, and that having had some experience in his Majesty's Navy, he is of opinion the gun is well calculated to produce the intended effect.

The

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so that the pump takes the water as it comes,) very little rubbish is then taken into the pump, and much wear and tear of buckets prevented.

Secondly.—I also by this valve and side pipe, preclude the necessity of ever drawing the bucket to displace the air. The clack piece was made as small as possible, and the clack with its gearing very low, in order to have as little space as possible between the bucket and the clack. The clack as represented in the drawing, possesses the advantages of being easily caught by the clack hook, in case of being under water. The ring prevents it from oversetling, and thereby fastening itself in the pumps, and the valves are very easily repaired by unscrewing the cross-bar, which admits of their being taken off and replaced.

Thirdly.—I avoid the inconvenience of suspending the pumps by ropes, by forming the suction-pipe in two pieces, one inner and outer pipe, the outer pipe is bored for about six inches in length, and the inner one turned cylindrically to fit it; they slide into each other, the whole length of a regular pipe, viz. nine feet; and they are made tight by collars of leather, surrounded by a cup filled with water and clay. The pumps are supported at proper distances, so as to suit the length of the pipes by beams, and across those are other beams upon which the flenches of the pipes rest, these last are not fastened by any bolt, in order that they may be readily removed; the pumps by these means remain stationary, and the suction-pipe lengthens as the pit is sunk, until it is drawn out to its full extent. The whole column is then lowered to the next flanches, and another pipe is added to the top; the lower end of the suction pipe is formed some what like a crank, in order that the sinkers, by turning it round upon the other pipe, may move it from one place to another,

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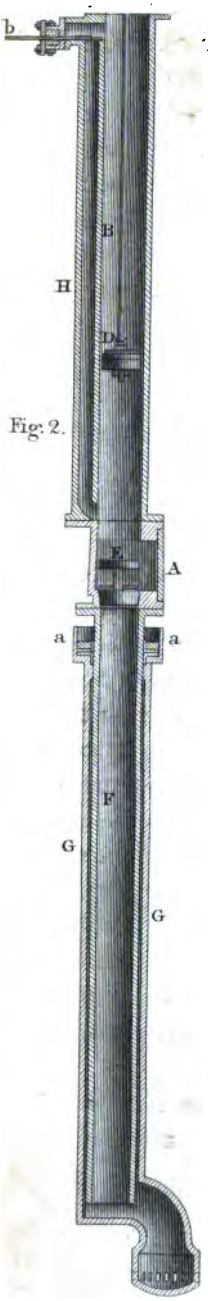
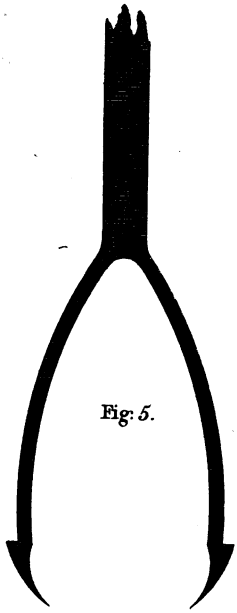
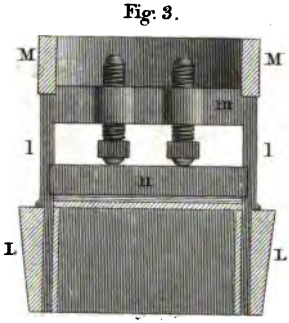
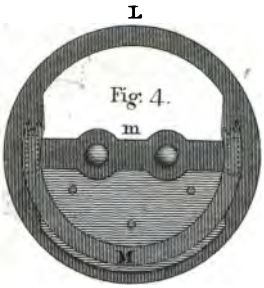
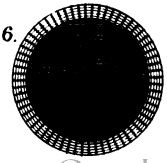
Mr. Wm. Brunton's Improved Pump for Mines.











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another, and so prevent the necessity of sinking immediately under it.

Fourthly.—The pumps being stationary as above-stated, the pipe at the top will of course deliver the water at the same level at all times, and instead of being obliged to lengthen the column every yard sunk, it will only be necessary every nine feet.

By sinking the pit above-mentioned in the manner I have stated, the whole of the difficulties so generally complained of were obviated, the safety of the workmen employed greatly increased, and much time, labour, and expence saved. If the above should appear to the Society deserving of their notice and patronage, or the publishing of it calculated for utility, they will thereby highly gratify and oblige,

Their most obedient humble servant,

W. BRUNTON,
Engineer.

Butterley Iron Works,
Derbyshire, October 20, 1810.

To C. Taylor, M. D. Sec.

Explanation of the Drawings of Mr. William Brunton's improved Pump, for Mining, and Sinking Shafts. Plate 5, Fig. 1, 2, 3, 4, 5, 6.

Fig. 1, is a section of a shaft or pit, with the pump fixed in it; it is cast in lengths of nine feet each, screwed together by flanches, and supported by beams extending across the pit; (as shown in the plan, fig. 6,) short pieces are laid across these,

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these, with half circular holes in them, these being put round the pump, just beneath a flanch, sustain the pump firmly, but may quickly be removed when it is required to lower the pumps in the pit; and, as they are not fastened, they do not prevent the pumps being drawn upwards; A, fig. 1, is the door which unscrews, to get at the lower valve or clack of the pump; this is more clearly explained in the enlarged section, fig. 2, where A has the same designation, B, fig. 2, is the working barrel, with the bucket D, working in it; E is the clack, also shewn enlarged in figs. 3 and 4; F is the suction pipe, and G G, the moveable lengthening piece; this slides over and includes the other, as in fig. 2, when the pump is first fixed; but, as the pit is sunk, it slides down over the pipe F, to reach the bottom, as in fig. 1; the outside of the inner pipe F, is turned true and smooth, and the inside of the outer pipe G, at the upper end, is bored out to fit it; the junction is made perfect by leathers placed in the bottom of the cup, *a a*, which holds water and wet clay over them, to keep them wet and pliable, and consequently air-tight; the lower extremity of the suction pipe G, terminates in a nose, pierced with a number of small holes, that it may not take up the dirt; this nose is not placed in a line with the pipe, but curved to one side of it, so as to describe a circle when turned round; by this means the sinkers can always place the nose in the deepest part of the pit, as shewn in fig. 1; and when they dig or blast a deeper part, they turn the nose about into it, the sliding tube lengthening down to reach the bottom of it; by this means there is never a necessity to set a shot for blasting so near the pump foot, as to put it in any danger of being injured by the explosion, as is the case in the common pump; in which this danger can only be avoided by moving the

the pump foot to one side of the pit, which necessarily throws the whole column of pumps out of the perpendicular.

The construction of the clack is explained by figs. 3 and 4, the former being a section, and the latter a plan; L L is a cast-iron ring, fitting into a conical seat in the bottom of the chamber of the pump, as shewn in fig. 2; it has two stems *l l* rising from it, to support a second iron ring M M; just beneath this, a bar *m* extends across from one stem to another, and has two screws tapped through it, these press down a second cross-bar *n*, which presses the leather of the valves down upon the cross-bar of the ring L, and this holds it fast, forming the hinge on which the double valves open, without the necessity of making any holes through the leather as in common; but the chief advantage is, that by this means the clack can be repaired, and a new leather put in in far less time than at present, an object of the greatest importance; for, in many situations, the water gathers so fast in the pit, that if the clack fails and cannot be quickly repaired, the water rises above the clack-door, so as to prevent any access to it, and there is no remedy in the common pump but drawing up the whole pile of pumps, which is a most tedious and expensive operation; in Mr. Brunton's pump, the clack can at any time be drawn out of the pump, by first drawing out the bucket, and letting down an iron prong, fig. 5, which has hooks on the outsides of its two points; this when dropped down will fall into the ring M, and its prongs springing out, will catch the underside and hold it fast enough to draw it up; another part of Mr. Brunton's improvement consists in the addition of a pipe H, fig. 2, which is cast at the same time with the barrel, and communicates with it both at the top and at the bottom, just above the clack; at the upper end the pipe is covered by a flat sliding plate, which can be moved by a small rod *b*, passing

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passing through a collar of leather; the rod has a communication by a lever, so that the valve can be opened or shut, by the men in the bottom of the pit; the object of this side pipe is, to let down such a proportion of the water which the pump draws, as will prevent the pump drawing air; though of course the motion of the engine will be so adapted, as not to require a great proportion of the water to be thus returned through the side pipe; yet it will not be possible to work the engine so correctly, as not to draw some air without this contrivance; and if it does, it draws up much dirt and pieces of stone into the pump, besides causing the engine to work very irregularly, in consequence of partially loosing its load every time the air enters the pump. Another use of the side pipe is, to let down water into the chamber of the clack to fill it, when the engine is first set to work, after the pumps have been standing still, and the lower part of the barrel and chamber empty.

DEAR SIR,

A GENTLEMAN whose name is Brunton, a very ingenious mechanist, who was many years with Messrs. Bolton and Watt, and who has now the management of the machinery of our iron-works and coal-mines, and also of a steam-engine manufactory established here, informs me, that last October, in your absence, he left at your house a drawing of a contrivance for facilitating the sinking of deep pits in coal works, or other mines, which are incommoded by water, which is, more or less, always the case.

The common practice is, by beginning with a short length of

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of pump-trees, and adding to them at the bottom as the pit deepens, and particularly toward the termination of the work; it becomes a very difficult and hazardous operation, and causes a great loss of time and expence.

Mr. Brunton's contrivance to get rid of this operation, is to fix the pumps permanently as they descend, except the bottom length of pipe, which is to be turned true on the outside; and there is connected with it a similar length of pipe, bored true, so as to slide upon the other like a tube of a telescope, and it will lower inch by inch, as the depth increases; a still further improvement is, to join to the last mentioned pipe, a short length with an elbow, so that after deepening a hole near the foot of the pump, the elbow turning in the segment of a circle, suffers the loose parts of the pump to drop gradually, till it require an additional length to the permanent or fixed part of the pump-trees, which is performed in less than ten minutes, and the loose part being in the mean time slid up to its place, is again ready for proceeding with another nine feet in depth.

If you have the drawing with its explanation, it would be unnecessary to add more than to observe, that any gentleman of the Society, at all conversant with mining, will in a moment see what we have proved by the actual use of it, that, simple as it is, it will be an acquisition of considerable value to those that are interested in mining. I trust you will think it worth the notice of the Society.

I am, Sir,

Your most obedient Servant,

W. JESSOP.

Butterley Iron Works, Derbyshire,
Dec. 3d, 1810.

To C. TAYLOR, M. D. SEC.

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The SILVER MEDAL *and* TWENTY GUINEAS, *were this Session voted to Mr.* J. ALLAN, *Blewitts Buildings, Fetter Lane, for a Reflecting Circle, in which the Screens can be readily shifted in taking Altitudes. The following Communication was received from him, an Explanatory Engraving is annexed, and one of these Instruments is preserved in the Society's Repository.*

SIR,

I BEG leave to inform you, that on Thursday last, I left at the Society's house, a mathematical instrument, adapted for the use of mariners, which I wish to submit to the Society's attention. It is a Reflecting Circle, commonly called La Borda's Circle, for the purpose of taking altitudes and distances at sea; and which I have greatly improved lately, by fixing the shade glasses different to what had heretofore been done, with some other improvements as a Reflecting Circle. The late Dr. Mackay, in a publication of his, called Mackay's Longitude, has a plate of La Borda's original instrument, but the shade glasses are so fixed, as to render the instrument useless, and which he was convinced of on my pointing out to him the fault; he said he would alter his plate to my method, and that he would state it as my improvement; but his death soon afterwards prevented it. I am aware the Society do not confer their rewards without advantageous qualities to merit their sanction. I respectfully say, that I consider my instrument to have merit, both in œconomy, and in the great improvement made on the

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the plan of the Reflecting Circle first invented. I shall be happy to point out this to the Society, and have the honour to be,

Sir,

Your humble Servant,

JAMES ALLAN.

Blewitts Buildings, Fetter Lane,
Dec. 24th, 1810.

To C. TAYLOR, M. D. SEC.

SIR,

AGREEABLY to the intimations of the Committee on Thursday evening last, I beg leave to explain to the Society, the properties of my improved Reflecting Circle; and which, with a Theodolite attached to it, would be useful both to the mariner and surveyor.

The Committee inquired what sort of center or axis the instrument had. I beg leave to state, it is an improved one of mine. The former way of centering this instrument, was only by a single pin, which both indexes acted upon; but the pin had so little bearing in the index, that it was not sufficient to keep the index-glass upright to the plane of the instrument in all its positions; I have therefore contrived to put what is called in our business, a male and female centre or axis, upon a simple but accurate method.

Permit me to make a few observations on circular instruments in general. I believe it will be universally allowed, that it is easier to make a circle nearer to truth, with respect

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to its horizontal plane, than it is to make a separate part of a circle so.

A sextant is only the sixth part of a circle, and is got flat by means of a plane, as near as the maker can get it, but is not turned on its own axis as a circle is; therefore I have no doubt, but that the best sextant usually made, is very short of the horizontal truth of a sixth part of a circle; and if we were to suppose a circle made of six of the usual sextants, it would be a very untrue circle with respect to its horizontal plane.

It has, therefore, been a general desideratum, that a circular instrument of reflection should be introduced, of simple construction, easy to adjust, and convenient for use. I have been induced to make several circular instruments of reflection in various ways, but none upon so simple a construction, or so cheap, as the present, nor so well calculated to prove any untruth, as my improvement upon Borda's; and I believe it will now be generally adopted for use.

There have been great numbers of Borda's circles made; I myself assisted about twenty-five years ago to make many, also since I have been in business for the last twelve years on my own account, but I never found any of them to give satisfaction till I invented the present improvement.

Captain M'Lennan, who traded to South America, had one of Borda's Circles made, similar to that described in Dr. Mackay's Longitude, but could not use it till altered by me last April.

The glasses in my instrument are moveable to any quarter that a person may wish to use it in; and by taking the same angle with each quarter, it affords an opportunity of proving the correctness of the instrument, which circumstance I hope justifies me in saying, that it is the only instrument of reflection that I know, so well calculated to prove itself.

I beg

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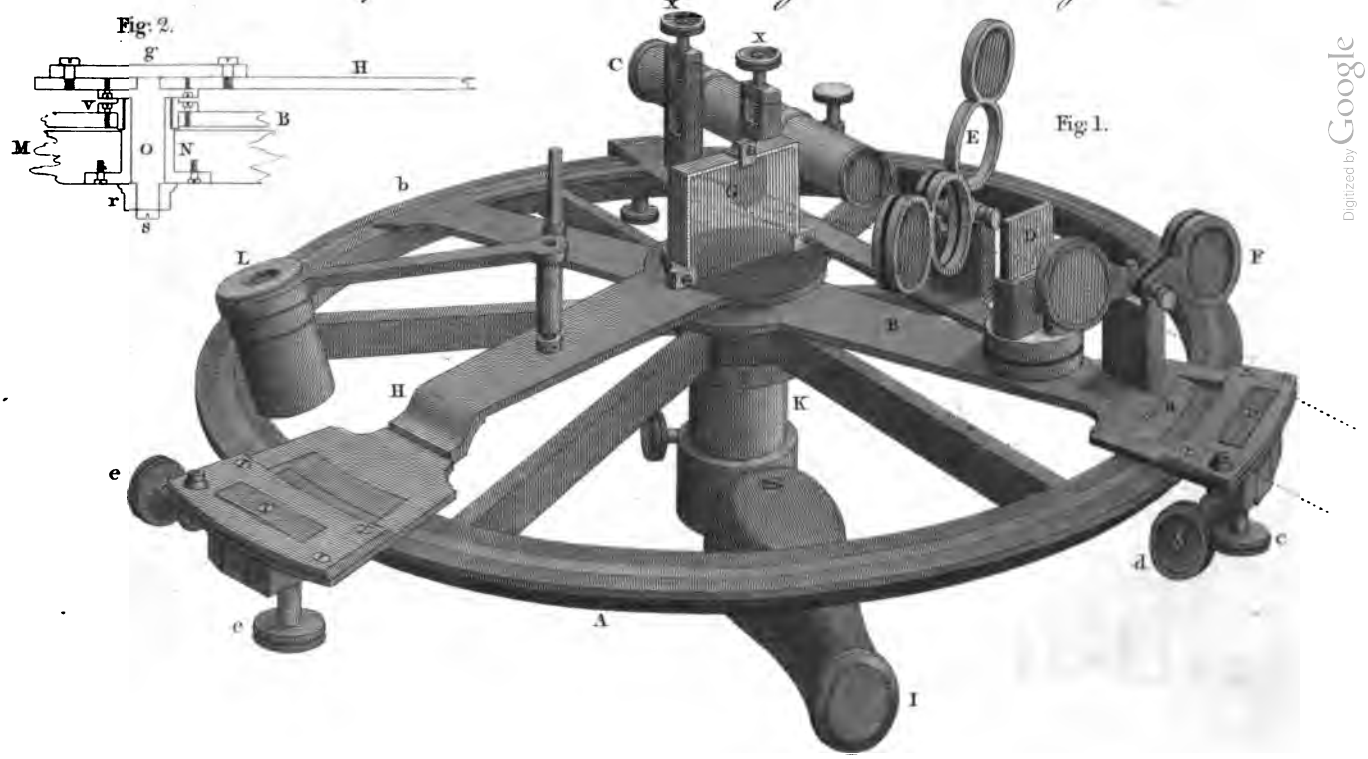
Mr. I. Allan's Improvement on the Reflecting Circle invented by Ch. Borda.



Drawn by J. Farey.

Engraved by S. Porter.

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I beg pardon for being so tedious; I assure you that I can make the instrument better than I can write or talk about it.

I have the honour to be,

Sir,

Your humble servant,

JAMES ALLAN.

Blewitts Buildings, Jan. 16th,
1811.

To C. Taylor, M. D. Sec.

Certificates.

A Certificate was produced from Captain H. C. Coxen, R. N., dated Feb. 5th, 1811, stating his opinion, that the dark screens which are fixed to Mr. Allan's Reflecting Circle, so as to act in the manner they do in a sextant, are improvements on the Reflecting Circle of Mr. Borda, which are not so fixed.

That it must be evident, even to the least experienced mariner, that there are frequent occasions, in taking the altitude of the sun, to change the screens *alternately*, in the shortest possible time, which cannot be effected in near so short a time by screens which take off and on, as in Borda's reflecting circle.

Captain Mackay, who has commanded the Lord Forbes, in the Jamaica Trade, for twenty years, stated, that the manner in which Mr. Allan's screens are fixed in his Reflecting Circle, is a great improvement. That from not being obliged to take out the shades when the sun is

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clouded, the object is not lost; and that when an instrument is obliged to be taken from the eye, to fix the screen in the old mode, the object is lost.

That by this instrument being a Reflecting Circle, it makes sure of a horizontal plane well divided, which can hardly be the case in a portion only of a circle.

That Mr. Allan's is the most complete instrument he has ever seen, and that he shall always take one with him to sea.

Description of the Drawing of Mr. James Allan's Improvement, on the Reflecting Circle of Borda. Pl. 6.

The Reflecting Circle, first invented by Tobias Mayer of Gottingen, and afterwards improved by the Chevalier La Borda, of Paris, is an instrument, which in its principle admits of such a degree of accuracy, as to be of the most important service to navigators; but it has hitherto been constructed in such a manner, that the inconveniences attending the use of it, have prevented its general adoption among seamen; any contrivances, therefore, tending to diminish these inconveniences, were deserving of the Society's notice. The construction of Borda's circle as they have hitherto been made, is minutely detailed in Dr. Rees's New Cyclopædia, article, Circle; and the mode of using it is there explained; it will be therefore unnecessary to describe any thing more of the circle delineated in pl. 6, than is essential to the elucidation of the improvements made by Mr. Allan.

The first of these is in the mode of applying the dark glasses,

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glasses, which are fixed on joints, so as to turn back out of the way, in the same manner as in the sextant; in the old instrument these glasses were fitted into sockets provided with tenants on the indexes, and fastened by a milled head screw, which took much time to change them; the second is the addition of double verniers to the index, carrying the telescope and horizon glass; these read upon opposite sides of the circle, and if a difference is observed between these readings by taking the mean of them, the error arising from any ex-centricity the index may have, will be corrected; and the third consists in fixing the index glass upon an axis, accurately fitted into the centre of the circle; by this means it is assured that the index glass in turning round, shall always be exactly perpendicular to the plane of the circle; in the old method, when the index-bar was merely fitted on a pin fixed in the center of the circle, it was impossible to make the circle so perfectly flat, or keep the index so accurately in contact with it, as by having an axis. To explain these improvements more perfectly, the reader is referred to plate 8, which contains a perspective view of the instrument; A, is the circle with six arms; B, is the index carrying the telescope C, and the horizon-glass D, with the two clusters of dark glasses E and F; at the opposite ends of this index are the two verniers *a* and *b*, the former has the clamp screw and slow movement attached to it, consisting of a screw *c*, which fixed the index to the circle; and *d* is the tangent screw, which will move the index a small quantity when turned, to adjust it accurately; G is the index mirror screwed upon the index H, which has also a vernier, and a clamp and tangent screw *e e*, similar to the other; I is the handle by which the instrument is held when in use; it is fitted to a socket K, which is screwed to the center of the circle, and is unscrewed from the circle when packed

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away; the handle is fitted to a springing socket, so as to turn round upon the socket K, that it may be turned to any side of the circle for the convenience of holding it; it may be fastened by a small milled nut, seen in the figure which binds the ends of the spring socket together; L, is a magnifying glass for the purpose of reading the divisions of the verniers; it is fitted upon a pin screwed into the indexes, and may be applied to either. The figure 2 in the corner of the plate is a section, shewing the construction of the central part of the circle, where M is a section of the thickness of the circle with a hole through the center, and a recess turned out in the lower side to receive a center piece N, which is fixed in with three small screws; a hole is turned in the center of this piece, and an axis O is fitted into it with the utmost accuracy, this axis has a flanch on the upper end by which it is screwed to the index H, and upon this, the under glass G, fig. 1, is fastened, by other screws passing through a piece projecting from the back of it; the axis is held in its place by a collet *r*, fitted on a square part of it, and held fast by a screw *s*; beneath this a piece is fixed on in the center of the circle, the edge of its flanch being shewn by *t* in fig. 1, it is part of the screw which holds on the spring-socket K, for the handle I, the upper end of the center piece N which comes up above the circle, is turned extremely true, and upon this the index B is fitted, or rather a brass ring *v* screwed to it, so as to turn round upon it as a center.

The telescope C, is fixed to the index by two cocks and by two screws *x x*, in these it can be raised up or lowered, to adjust the different brightness of the two objects seen in the horizon-glass D, the one reflected from the central mirror G, and the other seen directly through it; the dark glasses at E, are intended to moderate the light of the sun, in passing from the index to the horizon-glasses; the frames containing

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containing these glasses have holes E through them, to see through the telescope and horizon-glass, the other dark glasses F, are situated behind the horizon-glass D, and may be turned up or down as occasion requires.

The instrument is used in the same manner as the common Reflecting Circle; the angle being first taken on one side of the parallelism of the glasses, and then on the other; so that the angle is doubled, then it is repeated on a fresh part of the circle, as many times as the observer thinks proper, and the product divided by the number of observations taken; the mode of taking these observations is explained at full in Dr. Rees's Cyclopædia, and in Dr. Mackay's publication on the means of finding the longitude.

The SILVER MEDAL *of the Society was this Session voted to Mr.* JOHN HODGSON, *Charles Street, St. James's Square, for a Method of Correcting the Variations of the Mariner's Compass. The following Communication was received from him, an Explanatory Engraving is annexed, and the Instrument preserved in the Society's Repository.*

SIR,

I TAKE the liberty of requesting you, to submit to the Society for the Encouragement of Arts, Manufactures and Commerce, a small Theodolite, to which an addition has been made, calculated, it is hoped, to be of some utility.

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The frequent recurrence to the variation of the compass, which is necessary in the use of the Theodolite, is always attended with trouble, and not unfrequently productive of error.

It appears to me, that by a very simple expedient, these inconveniences may in a great measure be removed. To the magnetic needle of the instrument, let one of brass be affixed moveable upon the center of the former; the brass needle may be termed the corrector. Nothing more is necessary than to place the magnetic needle and the corrector, at the angle of the variation, in such a manner that the former being in the magnetic meridian, the latter shall be in the true meridian. The south end of the corrector will point to the true bearing of an object, seen through the sights of the Theodolite.

I also beg to lay before the committee a ship's compass, in which will be found a different application of the same principle. In this instrument, the needle is made moveable under the compass card, so as to be placed by the officer of the watch, or any other proper person, under the variation line, as often as an azimuth or an amplitude shall have been taken. The points of the compass will, by these means, be directed to their corresponding points in the heavens, and the mariner will know that he is really sailing upon the rhumb indicated by the cord.

I am inclined to think that a seaman may sometimes be liable to error, in the continual reference which it is necessary for him to make to the variation of the compass, from a possibility of his allowing it on the wrong side, by substracting where he should add, or by adding where he should substract it; even under a supposition that such a mistake is not likely to occur, the use of this instrument as an additional check, in a matter of so much importance as is the ascertaining

taining of a ship's course, may not be entirely unworthy of attention.

It is very probable, that from my imperfect information upon these subjects, I am now proposing what has before been suggested, and been found either to be wholly impracticable, or of little or no utility when reduced to practice. This is indeed the more probable from the extreme simplicity of the expedient itself, which could scarcely have escaped the attention of the many enlightened seamen, and others, who have devoted their minds to subjects of this nature. This consideration, however, is not sufficient to induce me to lose a chance of suggesting any, the most trifling hint, which may be useful to a class of men, to whom we are so much indebted.

It may be objected against the application of this principle to a ship's compass, that as the variation in a long voyage is continually changing, the card in a short time after it has been adjusted, will not point truly. This must be admitted, but it must also be recollected that it will agree with the last variation ascertained, and which is that on which the mariner must rely, until a fresh observation shall have been taken.

It may also be objected, that through the negligence of the persons employed to regulate this instrument, error may arise, equal to those which it is intended to obviate; but surely, whatever may tend to afford a correct knowledge of a ship's course, is of sufficient importance to render the adjustment of the card an office by no means unworthy of the Captain himself; and it cannot be supposed that he, or indeed any other officer, can be liable to error in an operation merely manual.

If we admit, however, that these objections are well founded, an instrument of this description might not be destitute of utility, placed in the Captain's cabin, or some other

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other convenient part of the ship, where it might continually indicate her course, without the necessity of a reference to the last observation; and at the same time serve as a check upon the several courses entered from the steering-compass.

Whatever obstacles may exist to the application of this contrivance to the ship's compass, I apprehend that there will be none to its utility, as applied to the instruments used in land surveying; confined as that business is to tracts of country, within which only a trifling annual variation takes place, and to which variation the corrector may be set whenever it becomes considerable.

To the common boat and pocket-compass, the same principle may be applied with equal utility; to the latter especially, which may frequently, perhaps, be in the hands of persons unacquainted with either the bearing or amount of the variation of the magnetic needle.

As the instruments submitted to the Committee are merely intended for illustration, I have not aimed at great nicety in their mechanism. It is obvious that they are capable of considerable improvement, and that both the Theodolite, and the ship's compass, may be so constructed, as to be capable of all requisite accuracy in their adjustment, without loading them in such a manner as to obstruct the free motion of the needle.

If a modification of these instruments, in itself so simple, shall be found to be of the least utility, I shall feel highly gratified.

I am, Sir,

Your very obedient servant,

JOHN HODGSON.

Charles Street, St. James's Square,
April 23d, 1811.

To C. Taylor, M. D. Sec.

Reference

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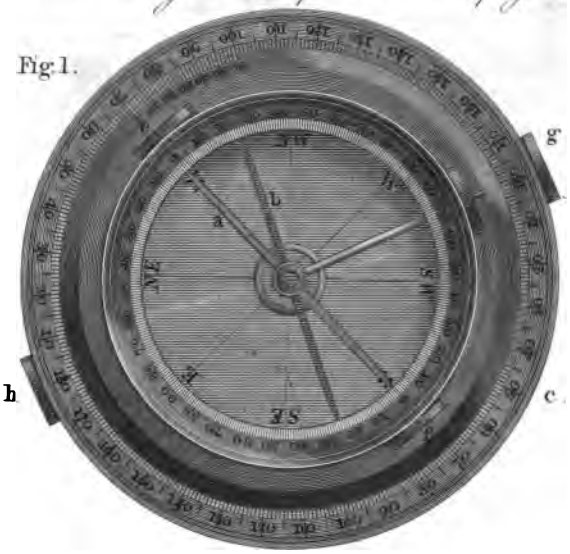
Mr. Hodgson's Improved Compass.

Fig. 1.



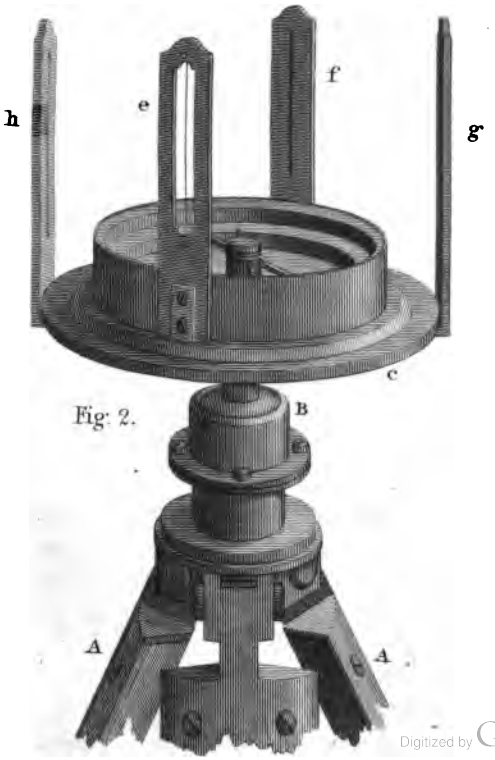


Fig. 2.

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Drawn by J. Farey.

Engraved by S. Porter.

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Reference to the Drawing of Mr. John Hodgson's Variation Compass. Plate 7, Fig. 1 and 2.

THE two figures in this plate are, a plan and perspective view of a small theodolite or circumferentor, for taking horizontal angles by the magnetic needle; it is to the latter alone that Mr. Hodgson's improvement applies; being a brass needle *a*, fig. 1, which is fitted upon the brass center piece, or cap, of the real needle *b*, in such a manner that it can be easily turned round to make any angle with the needle, and having sufficient friction to remain where it is placed; both needles are poised on the same center point, with an agate cap in the usual manner, the brass needle being only an index to point out the divisions on the circle within the compass; this index being set so as to make the same angle with the needle, as the difference of the true and magnetic meridians, will at all times give the true bearings of any object observed through the two sights *e* and *f*, which are diametrically opposite, and at the zero of the divided circle; at least whilst the variation of the needle continues the same; but as this alters by the instrument being used in a different tract of country, the brass index *a* must be turned round a corresponding number of degrees which are shewn by the divided circle in the box. The remaining parts, shewn in fig. 2, are A A, the upper ends of the tripod supporting the instrument; B the ball and socket by which the box is adjusted, so as to be horizontal; the stem of the ball has a circle *c* fixed to it, carrying two sights *g h*, through which the observations are taken; the circle *c* is divided into degrees, and the compass-box, which turns round upon it, has a vernier applying to them; this renders the instrument a theodolite, as any two objects may be

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be observed through the sights *e f*, and *g h*, and the divisions on the circle *c*, will denote the angle between them, and at the same time the bearing of any object may be taken by observing it through the sights *e f*, and noting the degree pointed out by the brass needle *a*, which is the true bearing required, without any allowance for the variation, as was the case in the common instrument.

The SILVER MEDAL *of the Society was this Session voted to* HENRY EARLE, *Esq. of Hanover Square, for an improved Bed for Persons whose Limbs are fractured, or who are sick and infirm. The following Communication was received from him, an Explanatory Engraving is annexed; a Model of the Bed is preserved in the Society's Repository, and the Letter, or Printed Tract, alluded to, is placed in the Society's Library.*

SIR,

THE well-known zeal which your most useful and excellent Society has ever evinced, in whatever concerns the public good, has induced me to send the model which will accompany this, for their inspection. It consists of a double bed, for the relief of such persons as from accidents or disease, are rendered incapable of moving, when it is necessary to obey the dictates of nature. The first was constructed about four years since, after having seen a poor fellow, who had broken

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broken both thighs and his left arm, and who, in consequence of the impossibility of being moved, was in a state almost too dreadful to describe, from the accumulation of fæces and maggots. I cannot here omit expressing my surprize, that so material a consideration as this should have been so long neglected, particularly as in many cases it really appears almost indispensably necessary. I have since that time had frequent opportunities of witnessing the very great comfort and ease which this contrivance has afforded, both to patients and their attendants. I feel it a duty incumbent on me, to render public an invention which is of such great consequence to Society at large. It arose from my finding the absolute necessity for such a contrivance. In its construction, simplicity and utility have been my study; the comfort and relief of persons in a most helpless and distressing situation, have been my object. I am aware, that the true value of such an invention can only be estimated by medical men, who have witnessed the mortifications, and even fatal effects, which arise from a want of cleanliness in this particular, and by such persons as have themselves been subject to the miseries which I have described. By means of this contrivance, patients in the very worst state may enjoy all the luxuries of cleanliness and ventilation. There is another object which the same contrivance has been made to answer, which is of nearly equal importance with the one just mentioned. It frequently happens, that it is necessary to raise patients to dress wounds on the back, and to place fresh linen under them. This cannot be accomplished where there is any fracture without great difficulty, and requires a number of assistants, who become weary before the dressings, &c. are ready. The present contrivance is eminently adapted to remove this difficulty; by it, the patient may be raised from the bed for any

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any length of time, without the least inconvenience or derangement of the fractures. The first person I tried this on, was a stout drayman, a patient of Sir Charles Blicke's, who had a compound fracture of both legs; this man was almost daily raised to have an ulcer on his back dressed, without experiencing any pain, and the broken bones remaining undisturbed. I believe I may very fairly attribute the well-doing of this case, in a great measure, to the perfect quietude in which the limbs were preserved. Another great advantage in this contrivance is, that it may be entirely managed by a single person. I have also made the frame of the upper bed rise at either end, independent of the opposite one. This may sometimes be useful, but is not to be considered as a very material object. The beds which were made for the use of St. Bartholomew's Hospital were compleat, both upper and lower bedstead. I have since managed, that the apparatus may with ease be fitted to any bed, at an inconsiderable expence, in order to adapt it to more general use. I will not intrude any longer on your valuable time, by a detail of the particular cases to which this bedstead is applicable; suffice it to say, that in all cases where perfect quietude of the body and lower extremities is necessary, this contrivance will be found of infinite service. If any further account is required, I shall beg to refer you to a letter which my father published some time since, on fractures of the lower extremities, in which this bed is fully described. I have taken the liberty to send one of these letters, of which I beg your acceptance, and remain,

Sir,

Your obedient humble servant,

HENRY EARLE.

Hanover-square, December 19, 1810.

To C. TAYLOR, M. D. SEC.

DEAR

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DEAR SIR,

THE model which I had the honour of presenting to the Society at its last meeting, being imperfect, I have taken the liberty of sending another, which will, I hope be found more complete, and is much less complex and expensive. I should feel myself obliged if you would explain, when it is next taken into consideration, that the first model was not intended as a correct representation of what I meant the real bedstead to be. It was only the principle which I was then desirous of submitting to the inspection of the Committee; the one which will accompany this is a precise model of the apparatus, which I propose to be manufactured for the future.

The principal difference consists in its capability of being adapted to any bedstead, without putting a single screw into, or otherwise damaging such bedstead. The frame is also kept perfectly steady, and when it is necessary to raise the rack, independent of the frame, it is effected in a much more simple manner. I subjoin to this an account of the frame, &c., though it will be much better understood by a view of the model, than any verbal description.

I remain, with great respect,

Dear Sir,

Your obedient servant.

HENRY EARLE.

Hanover Square, January 9, 1811.

To C. TAYLOR, M. D. SEC.

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Mr. Earle's Description of his Apparatus.

The apparatus consists in a frame of wood, of the length of a common bed, and about three feet six inches or four feet wide. Across this frame a strong ticking is strained, and fastened by buckles and straps, as in the model, or it may be corded like a common bed. In the centre of this ticking an aperture is made, of about four inches in diameter. This opening is closed when not used by a stripe of ticking, which passes across the frame, and is buckled to the opposite side. This frame is to be placed on the featherbed, mattress, &c. of a common bed, and covered with a blanket and sheet doubled, and placed above, and another below the aperture, or a hole may be cut in the blanket and sheet.

The frame is raised by two racks, which pass through mortices at its top and bottom; the frame is connected to the racks by chains, which proceed from its corners to the top of the racks, and which hook on to any height that may be required. The racks are worked in boxes by a wheel and pinion; a long spindle connects the two pinions, by which one handle raises the two ends at once; this spindle runs under the frame of the under bedstead. Each box containing the wheels is fixed to the rail of the under bedstead by two strong flat staples, which are fastened to the back of the box. When the patient is to be raised, independent of the frame a cross-bar of iron is fitted to the top of the racks; broad girths are to be passed under different parts of his body, and connected to this bar, the chains are to be undone, and the handle turned round, when the frame being no longer connected with the racks will remain stationary, whilst the patient is gradually raised and suspended from the bar.

When it is desirable to raise one end of the frame higher than

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than the other, it is accomplished by unhooking the chains from the opposite end to that which is to be elevated. In all these motions the descent of the rack is prevented by a a stop, which is passed between two of its cogs.

The price of this apparatus, if made of cast iron, will I believe be under five pounds.

HENRY EARLE.

Letter and Certificates.

DEAR SIR,

I HAVE just learned that you intend presenting to the Society of Arts, &c. a model of your very ingenious bedstead. I hope I may not be too late in offering my testimony of its great utility, and the comfort and ease which it affords to invalids under a variety of circumstances.

The evident advantage of this construction induced the Governors of St. Bartholomew's Hospital, to order some to be made, which have been for many years in constant and improved use. In compound fractures of the leg especially, I have considered it as nearly indispensable, as almost all the duties requisite, may be performed to the patient, without the danger of disturbing the limb, and for such cases I have principally used it in the hospital.

Sincerely hoping that you may have the gratification of seeing your benevolent invention adopted in general practice,

I remain, Dear Sir,

Your sincere friend and humble servant,

LEDFORD HARVEY.

St. Bartholomew's Hospital, Dec. 19, 1810.

To HENRY EARLE, ESQ.

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A CERTIFICATE was received from SIR CHARLES BLICKE, of Bedford Place, dated December 19, 1810, stating that he had much pleasure in offering the opinion he entertained of Mr. Earle's double bed. That he had often witnessed and experienced in St. Bartholomew's Hospital its utility upon urgent occasions, arising from serious accidents, and also the great comforts it affords to the patients.

A Certificate was also received from THOMAS WHEELER, Esq. dated St. Bartholomew's Hospital, December 19, 1810, stating the agreeable sensation he had on observing, in St. Bartholomew's Hospital, the great comfort resulting from the use of Mr. Earle's double bedstead, to patients labouring under various infirmities. That the benefits and accommodations of it are so great, as to entitle his useful invention to the notice of the public.

A Certificate was also received from THOMAS RAMSDEN, Esq. dated College of Physicians, December 21, 1810, stating, that he had seen the double bedstead which Mr. Henry Earle had submitted to the Society of Arts, &c. applied to the accommodation of patients under injuries to their limbs, which would have rendered it quite impossible for them to have been removed for the purpose of cleanliness, by any other means; and that he therefore thinks highly of its utility.

Reference to the Engraving of Mr. Henry Earle's Bedstead for Invalids. Plate 8, Fig. 1.

A B are the side rails, C the head, and D the foot rails of a common bedstead, to which an elevating frame is adapted

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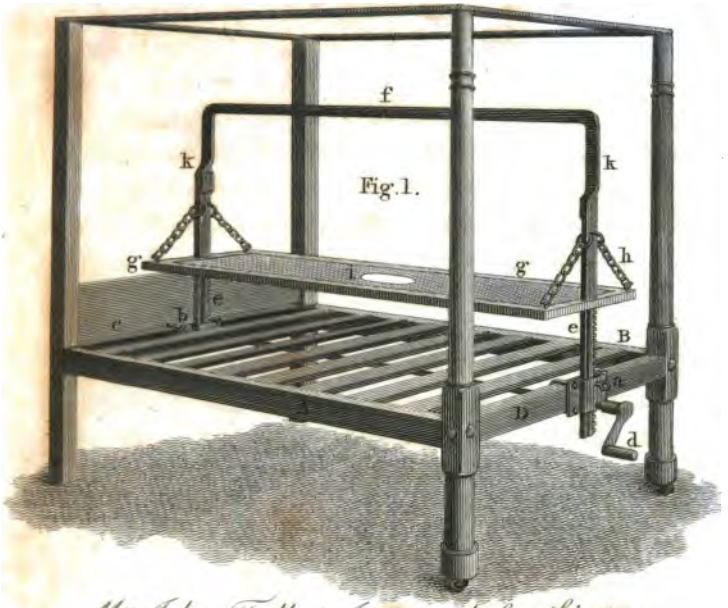
Mr. H. Y. Earle's Bedstead for Invalids. Pl. VIII.



Mr. John Fuller's Improved Scarificator.

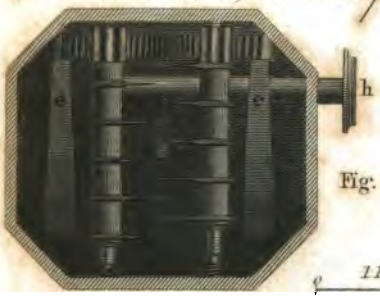


Fig. 2.

Fig. 4.

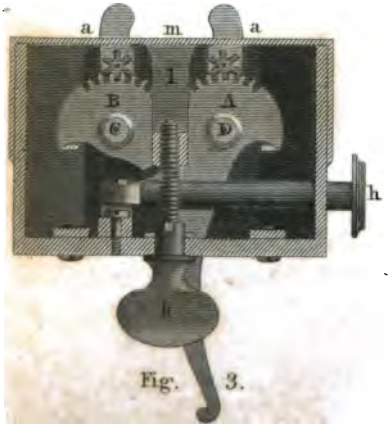


Fig. 3.

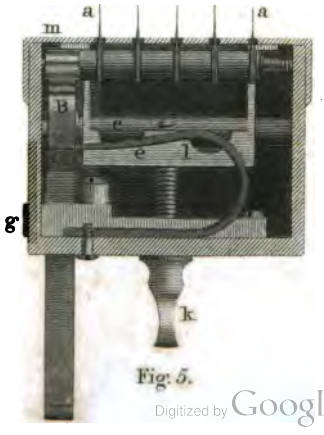


Fig. 5.

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...ow. by J. Farey.

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adapted in tht following manner: Two small iron frames or boxes *a b*, are fastened to the head and foot rails, by a pair of iron staples fixed to each, which encompass the rails, and by nuts screwed upon the ends of the staples; the boxes are thus firmly fixed to the rails, without making any hole in them; each of these boxes contains a pinion connected together by means of an iron axis, extended from one to the other, so that both are turned at the same time by the handle *d*, and elevate their respective racks, *e e*, from which the frame *g g*, is suspended by the chains *h*; the frame *g g* is made of wood, about four feet wide, and of the same length as the bedstead frame; and the racks pass through mortices made in the end rails of it, so that unless the chains are hooked on, the racks rise and fall independent of it; this gives an opportunity, if the case of the patient requires it, of inclining the frame upwards, by detaching the chains at the feet, and raising up the racks; the head one, which has the chains hooked on, raises up the head of the frame, leaving the feet resting on the bedstead; the racks may be secured at any elevation, by pins put through holes in the boxes *a* or *b*, which then catch between their teeth, and prevent them being moved until the pin is withdrawn; *f* is an iron bar or rod extending from one rack to the other, this bar is used to elevate the patient independent of the frame *g g*; when this is used, the chains are unhooked, and linen bands are passed under the invalid, who is supposed to be lying upon the frame, and the ends tied to the iron rod; then by turning the handle, he is elevated off the bed and frame, and may be suspended whilst the bed is made beneath, and then lowered down upon it without injury or much inconvenience. When the adjusting frame is used alone for elevating the patient, either for making the bed, or for introducing a bed-pan, &c. beneath the frame, the iron bar is removed; and for this

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purpose it has tenants at its ends, which are dropped into sockets made in the tops of the racks at *k k*; *i* is an aperture in the ticking of the frame *g g*, through which the patient without being disturbed, may discharge his fæces or urine, when the frame is raised for that purpose, and a vessel placed under the aperture to receive them.

The SILVER MEDAL *was this Session voted to Mr.* JOHN FULLER, *No.* 14, *Hatton Garden, for an Improved Scarificator. The following Communication was received from him, an Explanatory Engraving is annexed, and one of the Implements is preserved in the Society's Repository.*

SIR,

I WISH to submit to the notice of the Society an improvement in the construction of the Scarificator, and which I flatter myself will be found worthy their attention. It may be necessary to premise, that the Scarificator is an instrument used in cupping for making the incisions, from which blood is afterwards obtained by means of exhausted glasses. As the degree of pain caused by this operation, depends on the good or bad quality of the Scarificator, this instrument has always been an object of attention. The best Scarificators generally in use propell from ten to sixteen lancets, through about half a circle, which is effected by a part, termed the rack, moving on its centre or part of its edge. On part of its edge are situated teeth, which are so confined that by moving the cock or tail of the rack, they work three pinions, and make them

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them revolve about half a round: it is evident that lancets fixed on the axis of these pinions must also have a circular motion, and endeavour to cut any thing opposed to their passage; it is likewise evident that if a spring be so set that it can be released, and its force applied on a sudden to the rack, (somewhat similar to the main-spring of a gun-lock) all the lancets will be carried forward at once, and that with a force and velocity in proportion to the strength of the main-spring. The objections to this construction, and which frequently occur in practice are, that from the number of lancets necessarily used, the resistance to their motion is so great, that they do not move with the swiftness requisite to the ease of the patient; it is likewise often desirable to have the incisions rather deep, and then they are often quite stopped in their progress; besides this, by the lancets all moving one way, they are found to drive the skin up in folds, and thus present additional resistance, and occasion excessive pain to the patient; if to obviate these inconveniences the main-spring be made very strong, it is then, from its confined situation, exceeding liable to break, and if this does not happen, another inconvenience is produced, viz. from its very great strength it is scarce possible for any person to cock and discharge it with the requisite ease.

It was therefore suggested, that if two rows of lancets could be made to move in contrary directions, these, by keeping the skin equally stretched, would form clean incisions with much less force than in the former method: The Scarificator A, marked No. 1, was therefore constructed, and first used early in 1802; it is accompanied by its working model B; this instrument at the first contained the twelve long-edged spiral lancets C. This instrument immediately shewed its theory to be good, but it had its faults, the incisions were too long when of the necessary depth; from the complex nature

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of the two racks, &c. and from the confined situation to which they were restricted, they could not be placed in the most favourable position for motion, and was therefore liable to be out of order; these and many other objections were altered or removed in various ways, which at length terminated in the construction of the instrument D, marked No. 2, also containing twelve lancets, combining every advantage and improvement suggested by experience and reflection. This instrument admits of two main springs, but from the manner in which the racks work in each other, and in their respective pinions, they in effect become one, but maintain the advantage of being made more slight, and consequently admitting a greater extent of motion than a single stiff spring can possibly accomplish; besides which they are not so liable to break; and should this happen to one, the instrument would not be useless, for I believe that one of these springs would be strong enough for all ordinary purposes, as incisions are effected with much less force when the lancets diverge, but combined they never have shewn the least disposition to stop, however deep it might be necessary to set them, or strong the integuments to which they were applied; and consequently attended with greater ease to the patient. On inspecting the instrument and working model E, its simplicity, I flatter myself, will be admitted; nor is any force of the main-springs spent in overcoming unnecessary friction or ill-directed motion; the ease likewise with which the instrument is discharged, considering its strength of spring, will be noticed by every one accustomed to Scarificators. It may be objected to this instrument that it is larger and heavier than the ordinary Scarificator, but it is capable of being reduced without injury to the improvement, as is shewn by the instrument F, which is completely within the usual size.

I have

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I have been favoured with testimonies of approbation from the following respectable gentlemen. Dr. Willan, physician; Mr. Armiger, Mr. Frampton, and Mr. Lawrence, Surgeons and teachers of anatomy.—It will be also seen that while in the possession of Mr. Armiger, it was approved by the late Dr. Rollo, and by Dr. Irwin, the present Surgeon-general and Inspector of Ordnance Hospitals; and I may add as a further proof of its utility, if more be necessary, that by an illiberal use of private confidence, others have been made on a similar plan, and I am misinformed if the honour of this invention has not been claimed, within these few months, by three or four different individuals.

Accompanying this is another Scarificator, G, the peculiarity of which consists in the lancet being projected directly forwards, and returning into the box or case; the washing model N is not exactly such as is contained in the instrument, but an improvement on it. This instrument and model must be considered merely as experiments, to see how such motion could be effected; for, persuading myself that punctured wounds would be more painful and more difficult to heal in this, as they usually are in other circumstances, compared with incised wounds; and likewise having so happily succeeded in constructing that already described, which I consider so far superior, I never used it, and therefore can say nothing as to its operative merits; nor should I have recalled it from oblivion, but having lately seen a description of a Scarificator by punctured wounds, invented by a very ingenious and respectable medical gentleman, who speaks very satisfactorily of its performance, and which does not possess the advantage of the lancet withdrawing from the wounds, but are removed with the instrument, I thought, that should mine be a mistaken opinion, and that some real advantage attends this method, it occurred to me that submitting the instrument to the

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the Society, would be applying it to its best use; as from its possessing the property of the lancets withdrawing themselves, it might suggest some ideas for further improvement.

I am, Sir,

Yours obediently,

JOHN FULLER.

No. 14, Hatton Garden.

To C. TAYLOR, M. D. SEC.

CERTIFICATES.

A CERTIFICATE was received from T. J. ARMIGER, Esq. dated Theatre of Anatomy, Bartletts-court, Holborn, February 20th, 1811, stating, that the manner in which the lancets make the incisions by diverging, is well calculated to extend the skin during the action of the instrument.

That being at Woolwich in July, 1807, he shewed Mr. Fuller's instrument to the late Dr. ROLLO, and to Dr. IRWIN, the present Surgeon-general and Inspector of Ordnance Hospitals, who both highly approved of it.

A Certificate from HEATHFIELD T. FRAMPTON, Esq. dated St. Mary Axe, February 26th, 1811, stating, that the principle upon which Mr. Fuller's Scarificator acts, appears to him a considerable improvement, not only upon those in general use, but also upon that constructed by Mr. Fuller many years ago, in which the lancets strike perpendicularly. That he thinks Mr. Fuller will do well to make the instrument publicly known, that it may be brought into general use.

A Certificate

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A Certificate from WILLIAM LAWRENCE, Esq. dated Giltspur-street, March 22d, 1811, stating, that he has examined the Scarificator invented by Mr. Fuller; that the principle adopted in this instrument, of making the lancets diverge when they are discharged, seems to him to possess great advantages over that of the Scarificator in common use, and that the mechanism seems very well calculated to secure all the advantages which this principle can produce.

A Certificate from ROBERT WILLAN, M. D. dated Bloomsbury-square, March 6th, 1811, stating, that the new plan of a Scarificator, as constructed by Mr. Fuller, appears to him worthy of attention and encouragement, since it must diminish the inconveniences arising in, and after, the operation for which it is employed.

Description of the Engravings of Mr. John Fuller's Scarificator. Plate 8.

Figs. 2, 3, 4 and 5, are sections of this instrument, taken in different positions, to explain its interior mechanism; fig. 2, is a plan of the lancets, the top of the box being removed to shew them; fig. 3, is a section through the center of the box; and fig. 5, the same, but taken in the opposite direction.

The lancets *a a*, figs. 3, 4 and 5, are fixed upon two small arbors mounted parallel to each other, across the box; the lancets are so arranged on the arbors, that those upon one arbor are placed in the intervals between the lancets fixed upon the other; the arbors are placed near the top of the box, and the lancets act through clefts cut in the lid, (as shewn

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shewn in figs. 3 and 5,) when the arbors are turned round; this is performed by a pinion upon each arbor, receiving motion from two toothed sectors, A B, and which are also caused to act together by the teeth on their edges; they are fixed upon two parallel spindles C D, which extend across the box; the sector A, has a lever or handle attached to it, and coming through the bottom of the box, and by pulling this, the Scarificator is wound up ready for action. The power is given by two horse-shoe springs, *e e*, figs. 1 and 5, one end of each is screwed upon the bottom of the box, and the other acts in a notch *ff*, in each sector, so as to press those sides upwards; the sectors are prevented from moving, except when required by a catch *g*, which enters notches cut in the handle of the sector A; this catch is a brass bar, laying across the bottom of the box, as shewn in figs. 3 and 5, it moves on a screw as a center pin at one end, and is pressed towards the sector by a slight spring (not seen); when it is to be discharged, a button *h* is pressed in, which disengages the catch *g*, from the notches in the piece A, and permits the springs to turn the sectors about, and by their teeth acting in the pinions, turns the lancets round at the same time, which is effected by the teeth of the two sectors engaging each other, in order that they may not operate so as to move the whole instrument upon the skin, as is the case in the common scarificator.

Fig. 4, shews that the handle of the sector A has two notches in it, for the catch *g*, when it is caught upon the first of these, the instrument is in the position of fig. 3, which is the half-cock, the lancets standing directly upright out of the box; in this position, the depth they are intended to penetrate, is adjusted by means of a screw *k*, passing through the bottom of the box; it is tapped into a piece of brass *l*, which is screwed to the lid *m* of the box; the piece of

of brass is bent, as shewn in fig. 5, that it may clear the lancets and their spindles; when the screw is turned, it is evident that it will raise or lower the lid of the box, and cause the lancets to protrude more or less through it, and consequently enters a greater or less depth into the skin.

When the instrument is to be used, the handle of the sector A is to be drawn back into the position of fig. 4, which is at the full cock; the lancets are now turned down wholly within the box, and the springs wound up; the lid is then to be applied flat upon the raised-up skin of the part to be scarified; and by pushing in the button *h*, the catch *g* is moved round on its center pin, and pushed out of the notches in the handle of the sector A; the springs now turn the sectors, and the lancets fly out of the box with inconceivable rapidity; and making as many punctures in the skin, return into the box, having made exactly half a turn with their respective arbors. The dimensions of the instrument may be ascertained by the scale of inches annexed to the drawing.

TWENTY GUINEAS *were this Session voted to Mr.* GEORGE PRIOR, *Jun. of Otley, in Yorkshire, for an Improved Remontoire Escapement for Pendulum Clocks. The following Communication was received from him, an Explanatory Engraving is annexed, and a Model is preserved in the Society's Repository.*

SIR,

HAVING invented and made a remontoire escapement for long or short pendulum clocks, which I think will be much approved

approved of, I have taken the liberty to send you a model, with a drawing and description of the same, which I shall thank you to lay before the Society for the Encouragement of Arts, Manufactures and Commerce.

In this escapement there is not any more friction than in that which I had the honor of obtaining a bounty and a medal for, from your very honorable Society, in 1809, by whom it was allowed to have much less friction than any before invented. The advantage of this escapement is such as certainly to give the same exact and equal impulse to the pendulum without any friction, and which cannot be at all affected by any irregularities or variations arising by the clogging of oil and increasing of friction from the train, except during the very small part of the vibration that the pendulum is removing the spring detents from off the points of the teeth of the escape wheel, the effect of which can never be discovered in the rate by any variation the oil on the pivots and the increase of friction can ever produce, as long as the wheels will be able to wind up the renovating spring, which will be nearly as long as they can move at all, as the renovating spring has not either to be wound up quick, or to be pushed beyond any catch or spring to keep it in its proper situation, nor can there ever be any increase of friction in winding-up the renovating spring, as it is formed in as near a right line as possible; consequently must go almost endless without cleaning, and will never require any oil, (if all the parts of friction in the whole escapement be added together, they will not amount to the breadth of the acting part of the pallet of a common vertical watch verge, which every watch-maker knows acts without oil) still keeping the pendulum vibrating up to the same arc, which of course cannot avoid keeping time, if properly regulated for expansion, and which must be a very desirable

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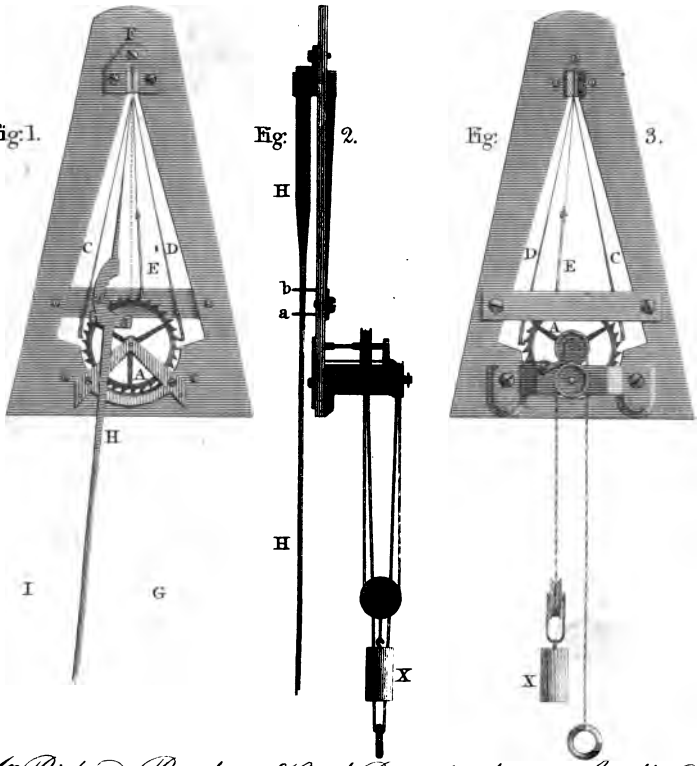
Mr. Geo: Prior Junr.'s Improved Remontoire Escapement.



Mr. Richard Bridgen's Head Piece, to obviate the ill effects of Water Gilding.

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Drawn by J. Farey.

Engraved by J. Fenton.

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desirable attainment for regulators, for astronomical and other observations, where the greatest accuracy is required, as regulators once properly regulated, ought to go as long as can possibly be contrived, without making the slightest alteration in them.

The complex contrivance of all remontoire escapements I am acquainted with, has always prevented their use, as no good performance, except for a short time, can be produced from them, as they are all liable to want frequent oiling or cleaning; even Mr. Massey's, rewarded by the Society of Arts, Manufactures and Commerce, which is the most simple and best that I know, must frequently want oiling, or it will stop, owing to the friction of the teeth of the escape wheel in sliding up the inclined planes of the renovating springs to wind them up.

I am, Sir,

Your most obedient servant,

GEORE PRIOR, Jun.

Yorkshire, Otley, April 8th, 1811.

To C. Taylor, M. D. Sec.

Explanation of the Engravings of Mr. George Prior, Jun.'s, Remontoire Escapement. Plate 9, Figs. 1, 2 *and* 3.

The swing wheel A, figs. 1 and 3, has thirty teeth cut in its periphery, and is constantly urged forwards by the maintaining power, which, in the model represented in the engraving, is supplied by a small weight X, figs.

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figs. 2 and 3; C D are two spring detents catching the teeth of the wheel alternately; these are, at the proper intervals, unlocked by the parts marked 2 and 3, fig. 1, upon the pendulum rod H, intercepting small pins *a b*, fig. 2, projecting from the detents, as it vibrates towards the one or the other; E is the renovating or remontoire spring, fixed to the same stud F as the detents; it is wound-up by the highest tooth of the wheel, as seen in fig. 1, (its position when unwound being shewn by the dotted line). This being the case, suppose a tooth of the wheel is caught by the detent D, which prevents the wheel from moving any further, and keeps the renovating spring from escaping off the point of the tooth; in this position, the pendulum is quite detached from the wheel; now, if the pendulum be caused to vibrate towards G, the part of it marked 2 comes against the pin *b*, fig. 2, projecting from the renovating spring E, and pushes this spring from the point of the wheel's tooth; on vibrating a little farther, it removes the detent D, which detained the wheel, by the part 3 striking the pin (*a*, fig. 2) which projects from the detent; the maintaining power of the clock causes the wheel (thus unlocked) to advance, until detained by a tooth resting upon the end of the detent C, on the opposite side; by this means the renovating spring will be clear of the tooth of the wheel as it returns with the pendulum, and gives it an impulse, by its pin *b* pressing against the part 2 of the pendulum, until the spring comes to the position shewn by the dotted line, in which position it is unwound, and rests against a pin fixed in the cross-bar of the plate; the pendulum continues vibrating towards I, nearly to the extent of its vibration, when the part 1 meets the pin in the detent C, and removes it from the wheel and unlocks it; the maintaining power now carries it forward, pushing the renovating spring E before

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before it, until another tooth is caught by the detent D, which detains the wheel in the position first described, the renovating spring being wound up ready to give another impulse to the pendulum.

N. B. The pin *b*, fig. 2, is not fixed to the renovating spring itself, but is part of a piece of brass, which is screwed fast to the renovating spring, and is made very slender near the screw which fastens it; this permits the end of the renovating spring to give way, if, by the weight being taken off the clock, or any other accident, the escape-wheel should be moved backwards, so as to catch on the detents improperly.

The following observations are necessary to be attended to in this Escapement.

1st. That the renovating and detent springs must spring from one centre, and as similarly as possible.

2d. That the force applied to the train must be so much more than what will wind up the renovating spring, as will overcome the influence of oil and friction on the pivots of the machine.

3d. That the renovating spring when unwound, must rest against the point of the tooth of the wheel, which will be an advantage, as it thereby takes as much force off the tooth of the wheel resting against the detent spring, as is equal to the pressure of the renovating spring C, against the face of the tooth of the wheel.

4th. The detent springs must be made as slender and light as possible, though whatever force they take from the pen-

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dulum, by their elasticity in removing them to unlock the wheel, so much force they return to the pendulum in following it, to where it removed them from, therefore action and reaction will be equal in contrary directions.

5th. That it is unnecessary for the pendulum to remove the detent or renovating springs, much further than is necessary to free the teeth of the wheel, as it will always vibrate up to the same arc; in table clocks it ought to remove them further, so that it can go when not placed exactly level, or what is generally termed, out of the beat.

TWENTY GUINEAS *were this Session voted to Mr.* RICHARD BRIDGEN, *No.* 61, *Broad-Street, Bloomsbury, for his Invention of a Method to prevent the Inhalation of Noxious Vapours in Gilding Metals. The following Communications were received from him, an Explanatory Engraving is annexed, and the Apparatus is preserved in the Society's Repository.*

SIR,

IN consequence of the dreadful effects which have occurred to a friend of mine, from the perniciousness of his business as a water-gilder, I have been led to make a machine to prevent persons from having such disorders. I have had the satisfaction to find that my invention is found to answer, and

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and that it will enable the men to work at the forge double the time they were enabled to do in the old method. In order to have them fairly tried, I have disposed of six of the machines, which are much approved of, and I have orders for several more. I hope the invention will meet with the approbation of the Society.

I am, Sir,

Your obedient humble servant,

RICHARD BRIDGEN.

No. 61, *Broad-Street, Bloomsbury,*
May 7th, 1810.

To C. Taylor, M. D. Sec.

It appeared from the enquiry of the Committee appointed to investigate the merits of Mr. Bridgen's invention, that the great injury which arises to the gilders, is from the noxious fumes of the mercury employed in this kind of gilding, and more especially from the act of rubbing the gilded metal after taking it out of the furnace, which operation the workmen are obliged to repeat frequently, and inhale the vapours of the mercury volatilized by the heat.

That the men are in a considerable degree protected from the injury whilst the work is in the furnace, yet sometimes the fumes are forced down the chimney upon them.

That the quantity of crude mercury collected in one of their chimnies is frequently considerable, and that thirty pound of crude mercury were lately collected in one chimney in Pickett-street where this business was carried on.

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That the act of rubbing the hot-gilded metal taken from the fire, takes up three or four times more time than during its being in the furnace.

That the price of one of these machines is about one guinea; that it effectually prevents the mercury, or any noxious effluvia, from being inhaled; and that the operator may even stand over lighted rags dipped in brimstone, without suffering any injury, during the time he wears this apparatus.

Certificates.

A Certificate from Mr. John M'Dorrough, Water-gilder, No. 3, Castle-street, Holborn, stated, that Mr. Bridgen's preserver had been tried in his workshop, and that he thinks it particularly useful in large works, to prevent the quicksilver, when in a volatile state, from entering the mouth and nostrils, and injuring the bowels, nerves, and speech of the operator.

Mr. H. Weatherhead, Gilder, No. 54, Dean-street, Soho, certified, that he had made a fair trial of Mr. Bridgen's machine, and thinks it of infinite service.

Mr. Rees Rees, and Mr. Joseph Blackwell, No. 4, Middle-court, Charles-street, Long Acre, also stated, that they had tried Mr. Bridgen's invention, and believe that it will fully answer the end designed, namely, the preservation of the health of gilders and other persons exposed to the noxious effluvia from metals; that it is perfectly easy in application,

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application, and not in the smallest degree inconvenient to the wearer of it.

Mr. Peter Brown, Gilder, No. 5, Charles-court, Strand, certified, that Mr. Bridgen's preserver prevents any injury from quicksilver; that he can work with it eight or nine hours, and leave off as fresh as when he began.

Mr. C. Johnson, Gilder, No. 4, Prujean-square, Old Bailey, gave his opinion, that Mr. Bridgen's apparatus completely answers every purpose intended, prevents the steam of quicksilver or aquafortis from entering the mouth and nostrils, and secures the workmen from head-aches, and other inward complaints, to which they are subject; and that he is certain if such apparatus was worn from their first engaging in the business, that gilders would never be hurt.

Description of the Engravings of Mr. Richard Bridgen's Apparatus for Water-gilders. Plate 9, Figs. 4 and 5.

This apparatus consists of a kind of leather mask or hood, which is fitted to the mouth and nose of the operator, and communicates with a pipe which turns backwards over his head, so that he breathes the air from behind him, which is not supposed to be contaminated by the noxious fumes of the mercury. The mask is shown detached from the head, at fig. 5, where *a* is the pipe, enlarging as it

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descends to a shape proper to receive and fit the nose, mouth and chin; the edges *b b*, *c c*, are stuffed with some elastic material, which adapts it to the forms of the nose and the cheeks; it is held on by the parts *d d*, which are curved so as to enclose the back of the head, and a string *e*, passing through holes in the ends of the parts *d d*, and being hooked into notches made in a piece of wood fixed on the front of the pipe *a*, draws it tight; the halves *d d*, are also tied together behind by strings, as shewn in fig. 4, and are connected with the front piece by hinges *f f*, fig. 5, so that they will open to take the mask off the head. A flexible tube of oiled silk may, if thought necessary, be tied to the end of the tube *a*, and conveyed to the nearest window, so as to give the workman the pure atmospheric air, if it is thought that the air in the room is tainted by the mercury. It is scarce necessary to observe, that the fitting of the mask to the nose, cheeks, and under the chin, must be carefully done, so as to leave no spaces at which the airc an enter; and therefore it must be stuffed to fit the person who intends to wear it. The whole mask is made of leather, and the outside varnished.

The

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The SILVER MEDAL *was this Session voted to Mr.* THOMAS WOOD, *of Great Berkhampstead, Herts, for his Invention to prevent prejudicial effects to persons employed in Pointing Needles. The following Communication was received from him, an Explanatory Engraving is annexed, and a Model of the Apparatus is preserved in the Society's Repository.*

SIR,

I HEREWITH submit to the inspection of the Society instituted for the Encouragement of Arts, &c. a model of an inclosed grindstone, intended to prevent prejudicial effects to the persons employed in pointing needles.

This grindstone is enclosed in a case of wood or metal, and hath a hood wherein a square of glass is inserted, designed to admit light on the articles under operation.

The particular advantages attending a grindstone suspended in this manner, with a hood and a damp cloth, are, that the stream or current of air, formed by the motion of the stone on its axis, is confined by the case under the hood of which it enters, and carries with it the fine particles of steel and sand, which it deposits on the lower part of the inside of the wet cloth, which forms the connection between the sides of the case, by these means rendering the operation of pointing needles less pernicious to the health of the operator. The stone may be worked by hand, by water, or machinery.

I am, Sir,
Most respectfully,
THOMAS WOOD.

Great Berkhampstead, Herts,
January 25, 1811.

To C. TAYLOR, M. D. SEC.

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Description of the Engraving of Mr. Thomas Wood's, Improvement in the Grindstones for Pointing Needles. Plate 10, *Fig.* 1.

THE grindstone A is enclosed in a box or case, formed of two circles of wood, one marked B, and another on the opposite side, which cannot be seen in this view; *a a* are two thin iron plates placed so near to the stone, as to be as close to it as possible without touching it; two other plates *b*, support a pane of glass at *c*, which at the same time that it prevents the dust from being thrown over the stone into the air, admits light to that part of the stone where the needles are applied; the remaining space between the edges of the two circular boards B, is filled up by a coarse cloth D, which encompasses about ¾ of the edge of the stone, and is then hooked up to the iron plates *a*, by means of two bent pieces of plate iron, to which the cloth is sewed, one of which is seen at *d*; and these are hooked upon other bent pieces, which form part of the plate *a a*; the cloth is wetted when put on, and will then catch the dust which is produced by the grinding, and when it has accumulated much, by unhooking the cloth it may be shook out, and the cloth being wetted is hooked on again; as the stone wears down the piece of plate iron *e*, situated in a groove formed by the edges of the plate *a*, is slided forwards to follow up the reduced edge of the stone, and other plates are put into the groove after *e*, when they are required; the case B is supported by a cross-bar of the frame in which the stone revolves, and which may be made in this or in any other form; the stone is turned in the usual manner of grinding-mills for needles, by a strap passing round a rigger, fixed on the end of its spindle; but this cannot be seen in this view, it being hidden behind the stone.

The

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The SILVER MEDAL *was this Session voted to Mr.* GEORGE WEBSTER, *Leeds, for his mode of conveying Steam from Boilers. The following Communication was received from him, an Explanatory Engraving is annexed, and a Model of the Apparatus is preserved in the Society's Repository.*

SIR,

IT is with pleasure that I communicate to you the contents of this paper, hoping that this invention will be beneficial to the public; the leading feature of the contrivance is simplicity, and that may possibly be a fair recommendation, at least such it seems to me.

I have just finished a new erection, for my better accommodation in the whitening and stoving of woollen cloths, and having been long annoyed in this business with the steam from the hot water in the pans, I determined if possible to get quit of it; besides I had ample proof in my old building, how injurious the steam was to the timbers of the floors, &c. Permit me to say, that I spent a decent sum of money to no purpose, and was giving up the idea, in despair of its accomplishment, when I hit upon this expedient, which answers my most sanguine desires.

I presume that this easy method of carrying away steam has never yet been in practice, and if once known will be of very considerable utility. In the numerous instances in trades where steam is inconvenient, it offers a ready riddance; to the timber in buildings, and to the furniture in houses, private kitchens, &c. it affords a desired security; but

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but in many trades, as glue-makers, tallow-chandlers, &c. where the effluvia, united with or without water, is offensive and obnoxious, it must be doubly and trebly valuable; and these cases are more numerous than I can recite or am acquainted with. The evaporating matter needs no longer to be the plague of the workmen, or the nuisance of the neighbourhood.

Hoping that the plan, though simple, and that the object, though not of the first magnitude, will be deemed worthy of the approbation of the Society,

I remain, Sir,

Your most obedient servant,

GEORGE WEBSTER.

Stover, Leeds.

Leeds, April 16, 1810.

To C. TAYLOR, M. D. SEC.

SIR,

IN the model I have sent to the Society, the steam chimney is carried up as high as the smoke chimney, which is the case at my works, being my first essay; but this is not immediately necessary, for in the bleach house belonging to Messrs. Benyon, Benyon, and Baze, flax-spinners, of this place, I advised the steam to enter the smoke flue, about six feet above the top of the pan, and with the same good effect.

Several of my friends here have adopted them in their kitchens,

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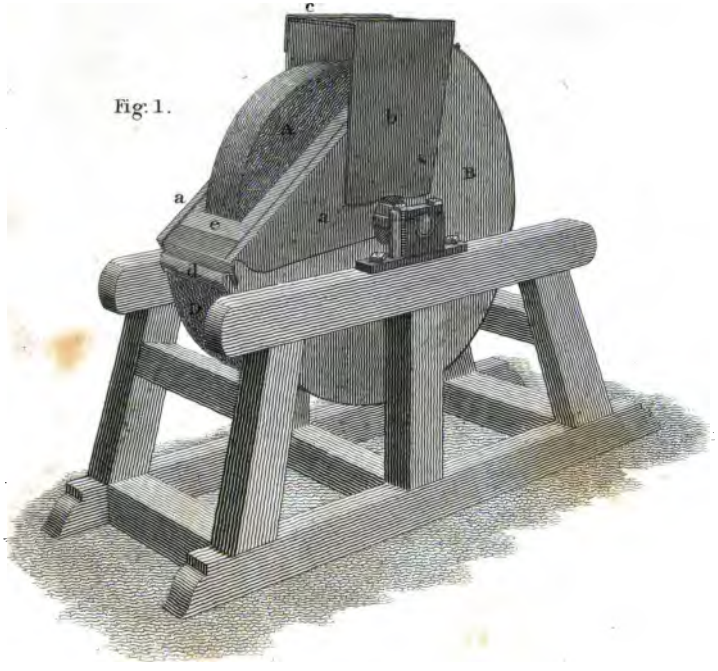
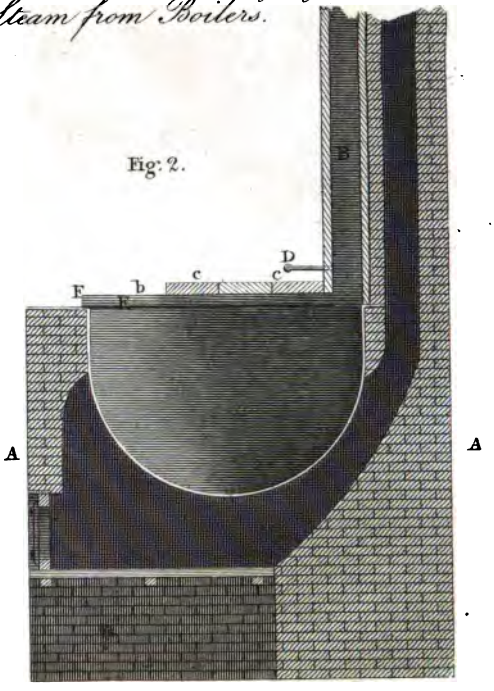
Mr. Wood's Enclosed Grindstone, for Pointing Needles.

Fig: 1.



Mr. Webster's Method of carrying off Steam from Boilers.

Fig: 2.



Drawn by J. Farey.

Engraved by J. Porter.

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kitchens, and wash and brew-houses. The steam flues are variously curved, as the situations required them to reach the nearest or most convenient smoke chimney, and with the same uniformly good success. I would, however, recommend, that at the lower part of the aperture, where the steam enters a smoke flue, a stone may be made to project a little way into the chimney, in order to break the current of the ascending smoke, and thereby facilitate the entrance of the steam.

I would remark further, that in some cases a curved or angular form may possibly be found the most eligible for the steam chimney, in order to prevent a gust of wind, or any other casualty, from forcing soot down into the liquid in the pan.—I have not yet witnessed any immediate necessity for it myself, and therefore merely suggest it as possible, but yet very easily remedied.

I am, Sir,

Your obedient servant,

GEORGE WEBSTER.

Leeds, May 23, 1811.

To C. Taylor, M. D. Sec.

This is to certify that we the undersigned have inspected Mr. Webster's contrivance for clearing his room from steam, and conveying it from his pan up what he calls a steam chimney, and found it to answer the desired purpose very effectually.

George Bischoff, Jun. Merchant.

John Cawood, Iron-founder.

Reference

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Reference to the Engraving of a section of Mr. Webster's Apparatus, for conveying Steam from Boilers, represented in Plate 10, *Fig* 2.

A A, the brickwork surrounding the pan.

B, the steam chimney, made of wood, about two feet broad and six inches deep. A small opening at the back part of the pan admits the steam into this chimney, it may from thence be carried up to the top of the building or turned into any smoke chimney near at hand.

In order to keep the water in the pan as hot as possible during the night, there are two dampers in the steam chimney at D, and if both these dampers are shut, and the whole top of the pan covered closely over at *c*, the boiling water even when the fire is withdrawn, will keep hot for the workmen till the next morning.

C C, are loose boards, fitting close to each other, and covering compleatly the better half of the circle of the top of the pan; and upon this circumstance depends the whole secret of getting quit of the steam. If you remove these boards or partial coverings, the steam chimney loses all its use. The letter *b* shews the part of the top of the pan which should be left open to admit to the workmen a ready communication with the hot water, and through this open part a current of cold air is constantly seen to press and force the steam rapidly up the steam chimney.

It is proper to add, that there must always be an empty space of two or three inches between the surface of the hot water and the under part of the cover *c c*, so as to permit the steam to pass to the bottom of the steam chimney. To effect this purpose, and at the same time to allow the copper to be full

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full of hot water, a rim or curb of wood F, about three inches thick, should be fixed upon the top of the copper, and upon this the covering boards *e o* placed; this allows sufficient room for the steam to press forward to the steam chimney at all times.

The cover and wooden steam chimney are removeable, and may serve for another copper if both are not wanted at the same time.

The SILVER MEDAL and TEN GUINEAS *were this Session voted to Mr.* JOHN PRIOR, *of Nessfield, near Shipton in Craven, for Improvements in the striking part of a Clock. The following Communications were received from him, an Explanatory Engraving is annexed, and a Model of the Improvement is preserved in the Society's Repository.*

SIR,

I WAS engaged to make, some time ago, a clock to go eight days, strike the quarters and hours, and to show minutes and hours upon four faces, on the external part of the steeple of a new church in Kighley, Yorkshire.

The wheel which strikes the quarters and that for the hours, when they came from the foundry, weighed between fifty and sixty pounds of cast brass. The hours are struck in a spiral cut upon a plate screwed to the wheel, like that I had the

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the honour to obtain a bounty for from the Society for the Encouragement of Arts, &c.; and am putting my son's escapement of a pendulum to it, for which he had the like honour.

Sometime in the spring of the last year, I thought if these two wheels could be made without teeth, pins might be put into cast iron as well as brass, and the difference of the prices of those two metals and the workmanship necessary for each, would at least be five guineas less in cast iron than cast brass, for two such wheels as the above, for a large church clock.

In contemplating upon the subject, I invented and had nearly finished in workmanship the last year, the enclosed striking part, but being so near the recess of the Society, I could not finish it in time.

Although there are many detached escapements for clocks and watches, there are not that I know of any detached striking parts, except this, which I have sent for the inspection of the Society for the Encouragement of Arts, &c. which I beg you will lay before them at their first meeting.

My new invented method of striking is easily and expeditiously made, as it lays aside the train of wheels and pinions, which is much better substituted by a small part of a circle, at the end of a lever toothed, which is elevated with the hammer, and may be put out of the frame of the clock turning a fly forwards and backwards. The first motion is to regulate the rapidity with which the hammer would strike, and the latter has nothing to do with the power that struck the hammer, but is acted on by gravity, which will regulate the intervals between the strokes more accurately than any train of wheels and pinions can do with a fly; at the end of which motion it unlocks a detent, which stops against the pins that strike the hammer in the wheel without teeth; and as the elevation of the lever puts forwards the count wheel one tooth, till one of the twelve pins for the use of counting the

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the hours, or the proper number to be struck, comes into the way of the lever, and then prevents it from unlocking the detent, then the clock gives over striking till the next hour.

It is to be remarked, that if this striking part had turned the fly only one way, the same number of turns could not bridle the rapidity of the motion of the hammer, therefore it follows, that the striking part will raise a heavier hammer than any one made to strike with a train of wheels and pinions can do.

I have the honor to be, Sir,

Your much obliged humble servant,

JOHN PRIOR.

P. S. Although the weight of the lever keeps the detent from being locked, it is not necessary it should, for a body in motion requires a great resistance to stop it, as at the end of the back motion of the fly, at which time it unlocks the detent, it has no occasion to be unlocked before, therefore the lever will have more than sufficient power to do that business; if it be made as light again as it is, or more, and whatever weight is taken from the lever may be taken from the first power, and still the striking part will elevate as heavy a hammer as before, and the first power or the weight will be more applied to elevate the hammer, and less to do with that which is substituted as a train of wheels or pinions.

Nessfield, near Skipton in Craven,
Yorkshire, April 10, 1811.

To C. Taylor, M. D. Sec.

Description

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Description of Mr. John Prior's new Striking Part of a Clock, Plate 11, *Figs.* 1, 2, *and* 3.

In this plate three elevations of this mechanism are given; fig. 1, is a section of the wheels, detents, &c., the front plate of the frame being removed to shew them; fig. 2, is a side view thereof; and fig. 3, shews the count-wheel, which is situated outside of the plate composing the frame; in all these figures the same letters are employed for reference to all the engravings.

The engravings only represent the striking mechanism, detached from the going part of the clock; A, fig. 1, is the barrel for the striking train, with a line *a* wound round it, and by means of a weight constantly giving the barrel a tendency to revolve in the direction of the arrow, and turn the wheel B with it, (this barrel and wheel is omitted in fig. 2, to avoid confusion); the wheel turns a pinion, on the arbor of which is a wheel *c*, containing thirteen pins, which project from its face, and, as it revolves successively, raise the tail *b* (shown by dots in fig. 1,) of the hammer D; when a pin leaves the hammer tail, the spring *d* throws the hammer against the bell E to strike the hour; this is the train of wheel-work for the striking movement; the detents for locking and unlocking these are as follows; a detent *e*, fig. 1, fixed to an arbor *f* extending across the frame, locks the pin-wheel C by receiving one of the pins on its end; the detent is urged into this position by a spring *g*, fig. 2; one of the pivots of the arbor for the hammer is supported in a cock F placed in the center of the space between the plates; the same pivot hole contains one pivot of another arbor *h*, fig. 2, which is therefore in a right line with the arbor of the hammer, and appears in that figure as if in one piece, but in reality

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reality has no connection with the hammer, except that a pin, *i*, projecting from the hammer-tail, intercepts another pin fixed into the arbor *h*, so that every time the hammer is thrown back by the pins of the striking wheel raising its tail, the arbor *h* is turned round a small quantity; on this arbor is fixed a long lever K, fig. 1, which has at its extreme end a circular rack of teeth, acting upon a pinion, or an arbor, carrying a fly, such as is always used for the striking movement; the fly is shewn edgeways in fig. 1, at *l*, but is omitted in the other figures to avoid confusion; it is this fly which regulates the time of the strokes; their number is ascertained by a count-wheel shewn at G, in fig. 3; this is placed to turn round on a stud or pin on the outside of one of the plates of the frame; it has seventy-eight ratchet teeth cut in its circumference, and has a detent, H, moving round on the same center pin; this has a piece of watch-spring *m* acting as a click to turn the wheel round when the detent H is lifted up, but when this is let fall its click slips over the teeth of the wheel; *n* is a similar click, but fixed to the frame plate, to prevent the wheel turning backwards; the count-wheel has pins projecting from it on the side next the frame plate, and these are arranged in the same order as the count-wheel always is, the first pair of pins being situated only one tooth distance; the second interval is two teeth, then three, four, and so on, the interval between the pins increasing one tooth each time up to twelve, making in all seventy-eight teeth; these pins are acted upon by an arm *p*, fastened to the rack K, and having a stud at the end which comes through a circular slit or aperture, (shewn in fig. 3,) in the frame plate, and rests upon the pins in the count-wheel at proper intervals.

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Operation of the Mechanism.

When the movement is at rest, the pin wheel *c* is locked by the detent *e*; at every hour this is pushed away from the center of the wheel by a pin in that wheel of the going part of the clock, which makes one revolution in an hour; the connection of these parts is not shewn in the drawing, but it may be done in various ways, as by a pin fixed in the detent, and passing through an aperture in the frame plate, or by a lever affixed to the arbor *f*, fig. 2, of the detent; the means will depend on the kind of clock the movement is applied to; all that is required being to push the end of the detent *e* so far from the center of the pin-wheel as to unlock its pins.

The weight now sets the wheels in motion, and the pins lift up the tail of the hammer to strike the hour; as the hammer is thrown back, it raises the rack K, and turns the pinions and fly as before explained, the motion of the pin-wheel and hammer being regulated by this fly, and prevented from accelerating; when the pin leaves the hammer-tail, the hammer, by its spring, strikes the bell, being detached from the neck and fly in its return, as is evident from inspection of fig. 2, by the time the hammer falls, the locking detent being relieved from the going part of the clock, resumes its original position, and prevents the wheel turning any further; the weight of the rack K causes it to descend, and the fly (turning in a contrary direction to what it did before) regulates the period of its descent; when the rack arrives at the position of fig. 1, it strikes a small arm projecting from the arbor *f*, and by this means pushes the locking detent away from the wheel which now sets off again, raising the hammer as before.

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Mr. John Prior's New Striking Part for a Clock.

Pl. XI.

Fig: 1.

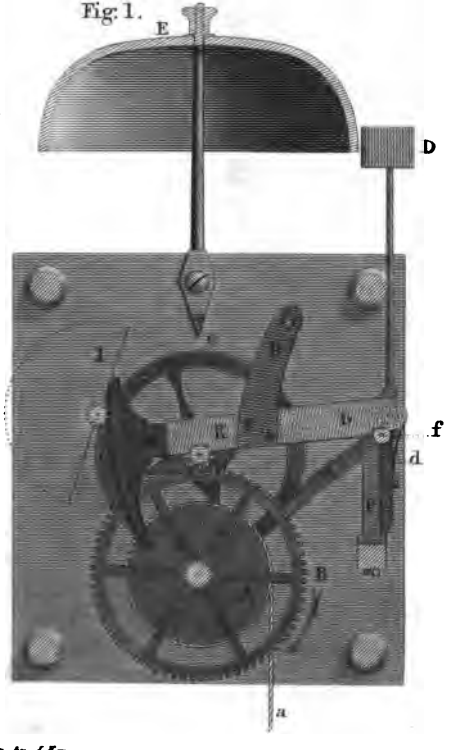


Fig: 2.

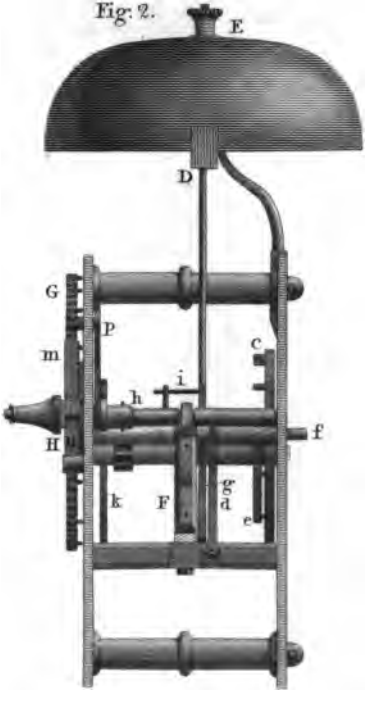
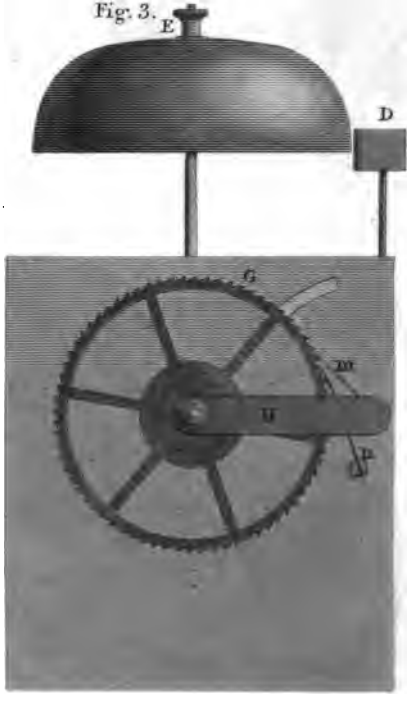


Fig: 3.



Drawn by S. Barry.

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This explains the application of the fly to regulate the interval between the strokes; but it remains to mention the means by which the proper number of strokes are made. The rack K has a pin projecting from it, and coming through a hole in the plate, raises up the lever H, which, as before explained, turns the count-wheel G round one tooth at every stroke of the hammer, but after having made the intended number of strokes, one of the pins of the count-wheel comes into such a position that the arm *p* of the rack rests upon it, and prevents the rack descending low enough to reach the arm of the detent *e*; the wheel is now locked, and must wait the expiration of another hour before it resumes its action, by the locking detent being moved by the going part of the clock; but when one stroke is made, the count-wheel being turned round one tooth, the pin is removed from the arm of the rack, and the striking continues till another pin is brought under it: the number of strokes the hammer will make therefore depends on the spaces between the pins in the count-wheel, and these are arranged as before mentioned, and as is well known to all clock-makers.

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PAPERS

IN

COLONIES AND TRADE.

The GOLD MEDAL, *being the Premium offered, Class* 165, *for curing British White Herrings in the Dutch method, was this Session adjudged to* FRANCIS FORTUNE, *Esq. of Lower Thames Street, from whom the following Communications were received*

SIR,

I HAVE taken the liberty to forward to the Society of Arts, &c., two half barrels and two kegs of herrings cured by Dutch prisoners after the Dutch method of cure, and I shall feel myself obliged if you will give me notice of the meeting of the Committee on this business, and I will attend to explain the mode of cure, when I hope I shall be thought worthy of the Gold Medal.

I am, Sir,
Your most obedient servant,
FRANCIS FORTUNE.

No. 8, Lower Thames-Street,
February 5, 1811,

To C. TAYLOR, M. D. SEC.

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Certificate.

This is to certify, that the two half barrels and two kegs of herrings sent to the Society of Arts, &c. are fair samples of four hundred barrels, cured by Dutch prisoners after the Dutch mode this year at Yarmouth and Broadstairs, on account of Mr. Fortune.

J. Lewis.
Thomas Bowen.

Isle of Dogs, Feb. 4th, 1811.

SIR,

Being desirous that the greatest degree of publicity should be given to every particular relative to the manner in which the Dutch were used to cure their herrings; and being aware of the extensive circulation of the Transactions of the Society for the Encouragement of Arts, &c. I feel anxious that a communication likely to be referred to by so many for information, should be intelligible and satisfactory. Under these impressions, and observing that the Society desire "that papers sent to them should be full, clear, and explicit," rather in the form of essays than of letters, I have stated more than perhaps may appear at first sight absolutely necessary, but I flatter myself not more than may prove really useful.

In the deep sea (which is the principal fishery for herrings) the nets are cast from the busses by sunset, and they drive by them alone expecting the shoals, the approach of which is generally indicated by small quantities of fish; and their arrival by immense flights of sea fowl. The best fishing is

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is with the wind off shore, for, when it blows in a contrary direction, the shoals are broken and dispersed, and the fishery is seldom successful while it continues in that point.

Immediately after the nets are hauled in, (which is often performed with considerable difficulty, by means of a windlass when they are full) the crew begin to gyp the fish, that is, to cut out the gill, which is followed by the float or swin, and divide the large jugular or spiral vein with a knife at the same time, endeavouring to waste as little of the blood as possible;—at this work the men are so expert, that some will gyp fifty in a minute.

Immediately after they are gypped, they are put into barrels, commencing with a layer of salt at the bottom, then a tier of fish, each side by side, back downwards, the tail of one touching the head of the other, next a layer of salt, and so alternately until the barrel is filled:—they are thus left, and the blood which issues from the fish, by dissolving the salt forms a pickle infinitely superior to any other that can be made. The herrings thus drained of their blood occupy less space, and the whole consequently sinks about one third down the barrel, but this sinking is at an end in about three or four days.

When these operations are being performed, the sea is often running mountains high; and it is not therefore to be supposed, that the barrels are so well coopered as not sometimes to allow the pickle to leak out; and in order to preserve the fish from being spoiled, which would otherwise happen in such cases, some of the gills and entrails are always put by in barrels with salt, in the same manner as the herrings, and yield a pickle of the same quality; with this pickle those barrels which have leaked are replenished, and the fish sustains no injury. Every operation is performed in the shade, into which the fish are immediately con-

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veyed on their being hauled on board. Each day's fishing is kept separate with the greatest care. The salt used is mixed, and of three different sorts, viz. English, St. Ubes, and Alicant, and each barrel marked with the date of the month on it on which it was filled.

The advantages of gypping the herrings are, that the blood which issues in consequence of the operation from the fish, yields a natural pickle, and improves the flavour; whereas, if left in the fish, it becomes coagulated at the back-bone, and forms the first cause of decay. The mixture of blood and salt operated upon by the extreme heat of the weather during the summer fisheries, produces a fermentation which nearly parboils the herrings, and removes the coarse and raw flavour so often complained of. The gypping is likewise often performed on shore, observing the same precautions; the only difference is, that they are seldom in that case of so good a colour. Gypped herrings are never of so fine a quality as when kept in their own original pickle; their value consists in their softness and flavour; it is this mode of curing herrings that used to be the pride of the Dutch, and this is the kind which supplied their home consumption, and were so much esteemed by all classes of people in Holland.

In order, as far as it is possible, to give a proof of the correctness of the above assertion, I shall state a fact for the information of the Society. During the last year, I employed a number of Dutch fishermen, prisoners, and others, with Englishmen, in gypping and curing herrings; and at one time, my agent at Yarmouth was offered 4 *l.* per barrel for all the herrings he had cured there, by a Dutch captain, in order to their being taken to Holland, while ungypped herrings were worth only 36 *s.* per barrel. The herrings now

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now under the consideration of your Society, are part of the quantity for which that offer was made.

Should the Society, after due consideration, think proper to adjudge me their Gold Medal, it will afford me much satisfaction, and convince me that my exertions have, in some degree, been beneficial to the community.

I am, Sir,

Your obedient servant,

FRANCIS FORTUNE.

No. 8, Lower Thames Street,
Feb. 26th, 1811.

To C. TAYLOR, M. D. SEC.

The SILVER MEDAL *of the Society was this Session voted to Mr.* PETER SLEAVIN, *No. 7, Little Brook-Street, Hampstead Road, for Curing British White Herrings. The following Communications were received from him.*

SIR,

I WILL thank you if you will have the goodness to lay before the Society, the sample I have sent of British Herrings cured by me in the Isle of Mann, as I have no doubt they are equal to the Dutch, or better, which I will explain if

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if permitted to attend the Committee to whose consideration it may be referred.

The quantity I have cured, is only eight barrels of thirty-two gallons each; I therefore cannot claim under the precise form of the premiums offered by the Society, but if honoured with their notice, I will furnish you with further particulars on the subject.

I am, Sir,

Your very obliged humble servant,

PETER SLEAVIN.

No. 7, Little Brook-Street, Hampstead Road,
Dec. 4th, 1810.

TO C. TAYLOR, M. D. SEC.

CERTIFICATE.

BY a letter from Mr. JOHN HEAD, to Mr. Sleavin, dated Douglas, Isle of Mann, Dec. 31st, 1810, it appears, that eight barrels of pickled herrings prepared by Mr. Sleavin, were shipped from thence.

Mr. Sleavin's Method of Curing Herrings.

WHEN the herrings are taken and alive, break their gills with your finger and thumb completely from the backbone, which will in course cause the fish to bleed: then throw them into the liquor prepared as follows: viz. to three quarts of salt water, put five pounds of common salt, and two

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two pounds of bay salt, and when dissolved, let the whole be boiled. One peck of common salt, and half a peck of bay salt, put between the different layers of herrings, will be sufficient for one barrel. Let the herrings remain in this liquor for three weeks, they must then be taken out and gypped, and a fresh liquor made with one gallon of salt water, the gypping of the fish, one peck of common salt, and a quarter of a peck of bay salt, and when dissolved, some of the spare fish must be put in it to make the liquor rich, and the whole be boiled for an hour, but so slow as that it may not burn; then let it cool and strain it off. The fish must be repacked in clean barrels, the last mentioned liquor put to them, and be careful that the fish be covered and kept close.

P. SLEAVIN.

No. 7, Little Brook-Street, Hampstead Road,
April 6th, 1811.

RULES

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RULES AND ORDERS

OF THE

SOCIETY,

FEBRUARY 20th, 1812.

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RULES AND ORDERS.

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RULES

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RULES AND ORDERS.

SECT. I.

Of the Officers, and Manner of their Election.

I. THERE shall be One President, Sixteen Vice-Presidents, Two Chairmen to each of the standing Committees of the Society, a Secretary, an Assistant Secretary, a Housekeeper, and a Collector of the subscription money; which officers shall be elected, by ballot, on the twenty-second day of March, annually; unless when that day happens on a Sunday, or Good Friday, or Public Fast-day, in any of which cases the election to be on the following day; and on that day no other business of the Society shall be transacted.

II. In order to this election, the President, one of the Vice-Presidents, or, in their absence, some other member appointed by the majority, shall take the chair at eleven of the clock in the forenoon; two ballotting glasses, marked A and B, shall be placed before the chair, the one for receiving the ballotting lists marked (A), and the other for receiving the ballotting lists marked (B), and stand open for receiving lists until two of the clock in the afternoon: at which hour the ballot shall be closed, when three scrutineers to each ballotting glass shall be nominated by the President, or presiding member, to examine the

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lists; but, in case not more than five members shall attend to vote on that day, the officers of the preceding year shall be continued till the next general election. That at the beginning of every election of a President, Vice-President, or Vice-Presidents, Chairman or Chairmen, the presiding member shall begin by calling over the names of the persons proposed as candidate or candidates for that election, in order that it may be known whether such candidate or candidates be in arrear.

III. A sufficient number of printed ballotting lists of all the officers in being, according to the forms annexed (A B) shall be ready; in which if any member chooses an alteration, he is to strike his pen across the printed name or names of such as he disapproves, and write on the blank side the name or names of such as he would substitute in their place; and no printed list shall be circulated in any of the Society's rooms on the day of election but that recommended by the Society.

IV. Each member shall deliver his lists folded up to the President, or presiding member, to put into the glasses; and the collector, sitting on the side of the chair, with a list of the members before him, shall mark the name of each member so delivering in his lists.

V. When the ballot is closed, one of the scrutineers shall open and read aloud each list, and file it, while the other two or more mark the names; and when all the lists are drawn, the marking scrutineers shall cast up and report the same to the chair; after which the President, Vice-President, or presiding member, shall declare the persons who have the majority of votes to be the officers respectively for the ensuing year.—Such election shall likewise be declared again at the next meeting of the Society.

VI. If

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VI. If the President, or any of the Vice-Presidents, shall resign or die, the remaining Vice-Presidents shall continue to act and preside at the meetings of the Society, in the order they are placed in the election list, until the next annual meeting for the choice of officers, or some other general, or extraordinary general meeting, which the Society shall please to appoint for such particular election.

VII. If any of the offices of Secretary or Assistant Secretary, Housekeeper, or Collector, shall become vacant, a person shall be appointed, at the next meeting of the Society, to act in such respective office of Secretary, Assistant Secretary, Housekeeper, or Collector, until the next general meeting, or an extraordinary general meeting, which shall be appointed for electing a person by ballot, to fill the vacant office for the remaining part of the year.—In case the office of Secretary, Assistant Secretary, Housekeeper, or Collector, be at any time resigned, which resignation shall take place on a subsequent day, it shall be in the power of the Society to proceed to the election of a proper person to fill such office on such resignation taking place, or to nominate one to hold it *pro tempore*, until such office shall be filled up. But no person shall be entitled to ballot at the election of any of the said officers, in case of a vacancy by death, resignation, or removal, who shall not have been a member previous to the declaration of such vacancy, unless he shall become a perpetual member.

VIII. At all elections of officers, if the suffrages should be equal, the decision shall be by lots, prepared by the scrutineers, and drawn by the President, Vice-President, or presiding member.

IX. Notice of the annual, or of any occasional election of officers, shall be published three different days, in such

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newspapers as the Society shall order, one week at least before the day of election.

X. Notwithstanding the election of officers is annual, the Society reserve to themselves the power of removing either their Secretary, Assistant Secretary, Housekeeper, or Collector, by two general or extraordinary general meetings; in which case the said officers shall be paid their salaries in such proportions as may be then due to them.

XI. Neither the Secretary, Assistant Secretary, the Housekeeper, nor the Collector of the Subscriptions, shall be members of this Society.

XII. No person, except he shall have been an officer the preceding year, shall be admitted as a candidate for any lucrative employment, without having personally presented his petition or memorial to the Society, sixteen days before the day of election; which petition or memorial shall be read immediately after the first, and again after the second reading of the minutes. "And in case of its being referred "to a committee to examine and report on the qualifications "of the candidates for any lucrative office, such committee "shall not enter on their examination of the candidates, "until within fourteen days of the day fixed for the elec- "tion (of which meeting for examination notice shall be "given to all the candidates), and they shall examine all the "candidates who attend for such purpose, in the order in "which their names occur in the alphabet." No member of this Society shall be eligible as a candidate for any lucrative employment in the gift of the Society, who shall be present, or act as a member, at any meeting or committee of the Society, after he has declared by word, message, or otherwise, his intention of becoming a candidate.

XIII. No officer who receives a salary, or servant, shall be

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be entitled to any premium or bounty whatever from the Society.

XIV. No officer or servant shall presume, under any pretence whatsoever, to accept of any present or gratuity from any candidate for a premium or bounty, or any tradesman having dealings with the Society, or any person coming to see the machines, on account of such premium, bounty, dealing, or inspection.

XV. No officer, servant, or person, employed to shew the machines in the several repositories, shall accept any gratuity from the maker or seller of any machines made after models or machines, for which the Society have adjudged any premium or bounty.

XVI. A Messenger shall be chosen or removed at any meeting of the Society; and so long as he continues in their service, he shall be paid a salary of seventy pounds a year.

SECT. II.

Duty of the President, Vice-Presidents, and Chairmen.

I. The duty of the President, Vice-President (in the order they appear in the list), or Chairman, is to preside at all meetings, with his hat on if he pleases, to regulate the debates of the Society; to state and put questions, both in the affirmative and negative, according to the sense and intention of the meeting; to check irregularities, and keep all persons in order; to direct summonses for all extraordinary general meetings; and to execute, or see to the execution, of all the rules and orders of the Society.

II. The President, or any one of the Vice-Presidents, shall sign receipts for the subscription money.

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SECT. III.

Business of the Secretary.

I. HE shall attend all meetings and committees of the Society; he shall take down all minutes of the committees, and produce them fairly written at the ensuing meetings. He shall read all the minutes of the meetings and committees to the Society; and translate such communications into English as shall be in any other language. He shall prepare all answers, when ordered by the Society, in such language as shall be directed, and lay the same before the Committee of Correspondence, for their examination, unless the Society shall judge an immediate answer necessary. He shall prepare an annual historical register of the Transactions of the Society, beginning every year from the first day of July, and ending the last day of June following. This register shall contain an account of all premiums bestowed, with the names of the persons who have received them, digested under proper heads: a list of the premiums offered by the Society, and upon what condition, and the number of members. He shall also prepare an account of the amount of annual and life subscriptions separately, the money in the Bank, and in the Collector's hands, as they shall have stood on the last day of June, and of other sums received during the preceding year; and what have been the expenses, in officers, servants, apartments, and workmen's and tradesmen's bills of all sorts. He shall prepare the list of members, advertisements, and other publications ordered by the Society; and take care that the same be properly and correctly printed: and his name, or that of the Assistant Secretary, as by order of the Society, shall be signed to all publications. All the letters or written papers of the Society shall be kept under

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under his care, and ready to be produced by him for the inspection of the members. He shall visit manufactories, or apply to manufacturers for information, when required by the Society; and he shall, as much as possible, endeavour to make himself acquainted with the nature and circumstances of the several arts and manufactures of this and other countries.

II. The Secretary shall read the whole of the Eleventh Section of the Book of Rules and Orders, at the time when the standing Committees are appointed to be declared in the Society; and also at the opening of the business in the general committee of election, ordered to be holden on the Friday following annually. And in consideration of his constant attendance, abilities, and diligence, he shall be paid a salary of two hundred and fifty pounds a year, and be supplied with coals and candles.

SECT. IV.

Business of the Assistant Secretary.

I. THE Assistant Secretary shall attend every day at the office of the Society from the hours of ten to two, during the sessions of the Society, and such further time as may be necessary to perform the business of the Society in his department, and at all meetings of the Society, and read the letters received. He shall likewise attend committees, when particularly ordered by the Society, or by one of the Chairmen of such Committees. He shall take down all minutes of the Society's proceedings, and produce them fairly written in the Minute-book of the Society at the ensuing meeting. He shall enter in the Reward-book, under their proper classes, the rewards bestowed by the Society, and make indexes to all the Minute books, and to the Transactions of the Society intended for publication. He

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shall paste all letters and papers in the Guard-book. All the written books of the Society shall be kept in the Society's office for the inspection of the members. He shall transcribe all papers or letters that have been prepared by the Secretary or approved by the Society, or by the Committee of Correspondence and Papers. He shall together with the Secretary examine the proofs and revises of the Society's publications—And as a satisfaction for such services, he shall be paid a salary of one hundred and twenty pounds a year.

II. Any member having obtained leave to take copies of the proceedings or papers of the Society, shall pay to the Assistant Secretary, for writing the same, after the rate of two pence for every hundred words.

SECT. V.

Business of the Housekeeper.

I. THE Housekeeper shall have an apartment in the house of the Society, that she may be ready on the spot to receive messages, letters, and all matters brought to the Society; to answer all enquiries; and deliver plans, lists, &c. to such members as shall come or send for them, of which she shall take care to have a sufficient number. She shall have the custody and care of all the furniture, books, such papers as the Society shall think proper, and other effects whatever, belonging to the Society. She shall have the direction of all the inferior servants. She shall receive and have charge of all the matters sent to the Society by candidates for premiums, and shall enter them properly, at the time when delivered, in a book for that purpose. She shall keep a fair inventory of all the goods and effects of the Society, to be always ready when called for. She shall keep an account of all stationary wares, printed books, coals, candles,

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candles, and all other particulars sent in by tradesmen for the use of the Society, in a Day-book for that purpose; and shall enter the same fairly, under their several heads, in another book, to be laid every month before the Committee of Accounts, as a check on tradesmen's bills. For all which services she shall be paid a salary of seventy pounds a year; and fifty pounds to pay the servants, for cleaning the rooms and furniture; and other incidental charges to which she is liable.

SECT. VI.

Business of the Collector.

I. THE Collector shall give such security as the Society shall require, for the trust reposed in him. He shall collect the subscription-money from the members, as it becomes due, paying all he collects over and above one hundred pounds, into the Bank of England, in the names of the two Chairmen of the Committee of Accounts for the time being, which sum of one hundred pounds he may reserve in his hands to defray the current expences of the Society. He shall attend all Committees of Accounts; and at every meeting of the Society he shall lay before them the Bank-Book, with an account of what money he has received, paid into the Bank, or remains in his hands. He shall keep the cash account of the Society, and draw out exact lists of the members, with the sums contributed by each, and arrears due. He shall deliver to the Chairman of the Committee of Accounts, on the last day of January in every year, an account of the members who have paid in the preceding year, as likewise how many were elected, declined, or remained in arrear in that year. For all which services he shall be allowed one shilling in the pound, on all such contributions, but not on legacies and particular donations.

He

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He shall attend all meetings and committees of the Society, and inform them of all matters necessary for them to know; for which he shall receive thirty pounds a year.

II. And whereas a Collector, with whose conduct the Society may be well satisfied, may happen to be unavoidably prevented, through sickness or accident, from performing his duty, at a time when it may be prejudicial to the Society to have the collection delayed; or a Collector may have given such cause of dissatisfaction as to render his suspension expedient, and the time requisite for a proper examination into his conduct, before he may be either restored or justly removed, may occasion a prejudicial delay in the collection; the Society to obviate these inconveniences, reserve to themselves the power of suspending in the latter case, a Collector, at any ordinary meeting when twenty members at the least are present; and upon confirmation of such suspension, of appointing, in either of the said cases, a temporary Collector, which appointment shall not require confirmation.

SECT. VII.

Meetings of the Society.

I. THERE shall be five General Meetings every year, in the Great Room of the Society, at seven of the clock in the evening precisely, viz on the first Wednesday in February, the third Wednesday in April, the second Wednesday in May, the second Wednesday in November, and the second Wednesday in December; At which meetings, or at any extraordinary general meetings only, if fifteen members at least are present, rules and orders for the government of the Society may be made and altered; and such rules, orders, and alterations, being approved at the next succeeding

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succeeding general or extraordinary general meeting, shall be valid and binding.

II. An Extraordinary General Meeting may be called, if twenty members, at the least, are present, and the majority shall desire such extraordinary general meeting; which extraordinary general meeting shall be advertised three days successively in two of the daily papers: And if fifteen members are present they may proceed to business.

III. No proposition shall be offered to the Society, as matter of new rule and order, or which shall contain in it an alteration or amendment, of any established rule and order, unless delivered in by a member, ten days before a general meeting of the Society, to the Secretary, who shall immediately cause copies to be made of it, and to be hung up in the Society and Committee Rooms, containing the date of the ensuing General Meeting when the same is to be taken into consideration. At the next general meeting, the Secretary shall, immediately after reading the minutes of the preceding meeting, read all such propositions once over, according to the order they have been delivered in; which propositions shall be read a second time, with a proper pause after each; and if any of those propositions be moved and seconded, it shall then be taken into consideration.

IV. All new rules and orders, once passed, are to be hung up in the Society's room till they are confirmed, with the date when passed the first time, and when to be confirmed.

V. All new rules and orders shall be signed by the President or the Vice-President, and undersigned by the Secretary, and hung up in the Society-room and Committee-room, for the information of the members, till such time as

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as they are inserted in their proper places in the subsequent printed book of rules and orders.

VI. The ordinary Meetings of the Society shall be held on Wednesday in every week, at seven of the clock in the evening precisely, from the fourth Wednesday in October, to the first Wednesday in June; and from the first Wednesday in June to the fourth Wednesday in October there shall be no meeting of the Society, unless called by the President, or two Vice-Presidents, on extraordinary occasions; and proper notice given thereof in the daily papers: And if at such ordinary meetings there should be present eleven or more members, they may proceed on business; but, in case there should not be eleven members present at seven o'olock, they may proceed on business with nine members only. And the said meetings shall have power to appoint such committees as they think necessary.

VII. An extraordinary meeting, for the doing of common business only, may be at any time ordered by the Society, in the same method as an extraordinary general meeting.

SECT. VIII.

Order of the Proceedings of the Society.

I. THE book of Rules and Orders, List of Premiums and of Members, shall lie upon the table before the President, or presiding member, at all meetings; and before the Chairman at all committees.

II. Each member is at liberty, before the President, Vice-President, or presiding member, takes the chair, to deliver to the Secretary, in writing, the names of no more than two persons whom he desires to be admitted auditors at that

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that meeting; which names the Secretary shall enter in a list, together with the name of the proposer. The list shall be read as soon as the chair is taken; and, if not objected to, the Collector shall carry the same to the Committee-room, and there call over the several names; when the persons allowed to be present may enter the Great-room, and seat themselves among the members, but shall not be permitted to debate or vote.

III. Persons desirous of being admitted auditors, are to remain in the Committee-room, until their names are called over by the Collector.

IV. No person to be admitted an auditor at any meeting of the Society, unless introduced by a member; nor shall any member propose an auditor to be admitted after the chair is taken.

V. No auditor to be admitted at the meetings of the Society but those who shall have obtained leave of the Society, or members of the Societies of the same kind in Scotland and Ireland.

VI. No member, whose subscription shall be beyond the current year in arrear, shall be at liberty to propose an auditor to be present at any meeting of the Society; and the Collector is directed to attend to this circumstance.

VII. At all meetings, business shall begin at seven o'clock in the evening with reading the minutes of the preceding meeting: but no part of such minutes shall be discussed till the whole has been read through.

VIII. Candidates shall be ballotted for; and, during the ballot, the business of the evening shall be proceeded on.

IX. The

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IX. The minutes shall be read a second time; and no other matter shall be proposed till the said minutes have been discussed, article by article: and all parts of the minutes, which are not objected to at the second reading, shall stand confirmed.

X. The President, after the first reading of the minutes, is to declare, that every member is entitled to vote and assist in all the transactions of the Society and its Committees, unless his first subscription shall not have been paid; and that no member shall speak more than once, on one and the same question, unless called upon from the chair to explain himself, excepting only the original proposer of any new motion, who shall be allowed the liberty of replying once on such occasion; and that no person is entitled to be present at any meeting or committee, whose subscription shall be at any time for two full years in arrear; and that no person shall be entitled to debate, or vote at any meeting or committee, until his subscription for the current year, and all arrears, are paid.

XI. Reports from committees shall be made; and the adjournment of those committees, which have not finished the business referred to them, shall be declared to the Society.

XII. All reports from the different committees shall be made to the Society in succession, according to their respective dates, unless when ordered otherwise by the Society.

XIII. A report from a committee, except in the case of a bounty, shall not be recommitted but by a majority of two thirds.

XIV. The report from the Committee of Accompts is to be made between the first and second reading of the minutes, the next Wednesday succeeding the audit.

XV. New

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XV. New matter to be considered.

XVI. The president or presiding member, shall then read over to the Society the subjects the committees are to discuss the following days.

XVII. Letters to be read,

XVIII. No question shall be put on any motion, unless the motion be seconded.

XIX. No motion shall be permitted for the repealing any confirmed resolution of the Society, till such resolution has been in force three months; nor shall any motion that has been rejected be made again, till after three months from the time of its rejection.

XX. No new proposition shall be entered upon after ten of the clock at night, unless the motion be read from the chair before ten o'clock.

XXI. No member, on any pretence whatsoever, shall be at liberty to move, that he may have leave to make a motion after ten of the clock.

XXII. No premium shall be offered to the public, unless it has been approved of by a committee, and agreed to by the Society, at one meeting, if the premium shall have been already published in the Society's transactions; or at two meetings of the Society, if it be a new premium: and no premium or bounty shall be given to any candidate, unless the Society, at two meetings, shall be satisfied that such candidate does really deserve the same.

XXIII. When any proposal is made for a premium or reward, and the motion made and seconded, it shall be delivered to the chair in writing, and the same shall be read twice.

XXIV. No motion shall be made for the dispensing with any

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any condition of a premium as offered in the advertisement, on any pretence whatever.

XXV. No motion shall be admitted to be made for the lending any of the machines of the Society, on any pretence whatever, excepting for inspection to the Board of Trade, the Solicitor and Attorney General, or some public body, by a special vote of the Society.

XXVI. No proposition shall be carried into execution till it is approved and confirmed by the Society at two subsequent meetings; but, if a negative be put upon an affirmative proposition, or a negative proposition be agreed to, such decisions shall not require confirmation. But this article only applies to ordinary meetings.

XXVII. If, at the second reading of a proposition, any alteration shall be made by way of amendment, such alteration shall not want the confirmation of another meeting, unless the Society shall increase a premium, bounty, or any other expense; in which case it shall require the confirmation of another meeting.

XXVIII. No member shall be permitted to be on the area or space between the tables, while the Society is proceeding on business; nor shall any member stand up within the seats, unless it be to speak, or to go from, or return to his place therein.

XXIX. When any member speaks he shall stand up and address himself to the chair, and the rest shall remain silent.

XXX. When two or more offer to speak together, the President, or presiding member, shall determine who shall speak first.

XXXI. The

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XXXI. The member that speaks to order shall be first heard.

XXXII. When a matter is in debate, if any member speaks to new business, the President, or presiding member, shall interrupt him; but the circumstance of the previous question being moved by any member during the debate on any motion, does not necessarily preclude the continuation of such debate.

XXXIII. When on any question an equal number of hands appear to be held up for and against the same, the President, or presiding member, shall appoint two members to count and report the numbers to the chair.

XXXIV. In all meetings and committees, the President, or presiding member, shall only vote when the suffrages are equal.

XXXV. The opinion of the Society shall be taken by ballot, instead of hands held up, if desired by five members.

XXXVI. A division shall not be granted but upon the request of six members.

XXXVII. No new matter, either respecting the government of the Society, or the measures for the improvement of arts, manufactures, and commerce, shall be received, unless it be laid before the Society in writing.

XXXVIII. At every meeting of the Society, all the resolutions of such meeting shall be taken down at large, and read aloud by the Assistant Secretary immediately after they have been respectively agreed to.

XXXIX. No meeting shall be adjourned until the majority of the members present, upon the question being put and seconded, shall agree thereto; nor shall the question be put until the names of the candidates proposed at such meeting have been read.

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SECT. IX.

Order of Proceedings at a General or an Extraordinary General Meeting.

I. THE minutes of the preceding ordinary meeting shall be read.

II. The President, or presiding member, shall then declare the meeting to be a general or an extraordinary general meeting.

III. The minutes of the preceding general meeting shall be read the first time; and after a short pause shall be read a second time; when such parts as are not objected to shall stand confirmed.

IV. New matter relative to such meetings only may be proposed and discussed.

V. If, after a proper pause, no new matter is proposed, then the general or extraordinary general meeting shall be adjourned to the next general meeting in order; after which the usual business is to go on.

VI. Every proposition that is to be discussed at a general meeting, shall be publicly read by the Secretary, on the preceding Wednesday, immediately after the second reading of the minutes, and usual declaration from the chair.

SECT. X.

Election of Members.

I. No person is to be proposed for a member, unless recommended by three members; and the name, place of abode, and addition of the person recommended, shall be delivered

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delivered in, signed by the proposers, which shall be read by the Secretary, who shall insert the name in a list of candidates, to be hung up in the Society and anti rooms, until the second following ordinary meeting of the Society, at which such persons shall be balloted for, provided there be fourteen days between the meetings: The names of the proposers, together with the name and addition of the person to be balloted for, shall be put upon the ticket, placed on the box, during the time of such ballot. The Collector, having a sufficient number of balls, shall give one to each, of the present balloting members, and, if two thirds of the members then voting shall ballot in his favour, he shall be deemed a perpetual member, upon payment of twenty guineas at one payment; or a subscribing member, upon payment of any sum, not less than two guineas annually (BB). Peers of the realm, and Lords of Parliament, desirous of becoming members of this Society, shall on their being proposed at any meeting of the Society, be immediately balloted for. Ladies are eligible as members of this Society; are entitled to attend and vote in its proceedings and committees, and are alone entitled to vote by proxy on elections only, through the medium of some gentleman who is a member, but such member must produce a written authority from the lady for whom he votes as proxy.

II. In election of members, a second ballot shall be granted, if immediately demanded.

III. Every person, upon his election, is to pay his subscription-money, or one of the members is at liberty to make the deposit, in his name, in case of absence.

IV. Every member shall pay his subscription money in arrear within one month after he has been applied to by letter from the Collector for that purpose, according to the

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copy annexed, (C); and no person shall be entitled to debate or vote, at any meeting or committee, until his subscription for the current year, and all arrears, are paid: And no person shall be entitled to be present at any meeting, or committee, whose subscription shall be at any time for two full years in arrear: Yet as several, who have declined continuing their subscriptions for a time, may be again desirous of becoming members, but by the foregoing rule and order seem to be precluded until their arrears shall be discharged, it is hereby ordered, that any such person shall be capable of being re-elected a member of the Society. in the same manner, and on the same terms, as if he had never been a member before.

V. When any person is elected a member, the Secretary shall immediately inform him thereof by a letter (D); and the Collector shall wait upon him, if in town, and carry a printed book of rules and orders, and the list of premiums.

VI. The names of such persons as have not paid their first subscription-money, are to be omitted in the list of members.

VII. Foreigners, or persons who do not reside in Great Britain, may be elected, by ballot, corresponding members of this Society, without being subject to any annual payment: and shall be admitted to the meetings and committees of the Society during their residence here, provided such residence does not exceed three months at one time; but shall not be permitted to vote.

VIII. On election of any person to be a corresponding member of this Society, a letter shall be written by the Secretary, acquainting him therewith; and the Secretary, in such letter, shall enclose him an exact copy of the standing rule and order, "That no member of this Society shall "hereafter

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"hereafter be a candidate for, or entitled to receive any premium, bounty, or reward, except the honorary medals of "the Society;" and also, that the Society request their corresponding members, as often as shall be convenient, to favour them with accounts of such useful discoveries or improvements in any of the polite or economical arts, as may come to their knowledge.

SECT. XI.

Of Committees.

I. THE standing committees for the year shall be declared, and the members thereof shall be named by the Society, at eight o'clock, on the first Wednesday in March; and a general committee of election, to which the chairmen and members of the several committees shall be especially summoned, shall meet on the Friday next ensuing, to take into their consideration the choice of two chairmen to each of the several committees for the following year, and report their names to the Society on the second Wednesday in March, as proper persons to serve as chairmen in the respective committees, under the titles of which they shall be severally inserted, as follows:

Committee of Accounts.
Correspondence and Papers.
Agriculture.
Chemistry, Dyeing, and Mineralogy.
Polite and Liberal Arts.
Manufactures.
Mechanics.
British Colonies and Trade.
Miscellaneous Matters.

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And they are to report and recommend them to the Society as proper persons to be elected at their annual election of officers, to be held on the twenty-second day of the same month.

II. Nine committee minute books are to be kept; one for each of the above-mentioned committees.

III. Two chairmen shall be elected by ballot, for the Committee of Accounts, Committee for Miscellaneous Matters, Committee of Correspondence and Papers, and each class of the Committee of Premiums severally; who shall preside for that year when present, in the order they are named; and in case neither of the said chairmen should be present at their respective committees, any other member shall be appointed by the committee, chairman for the occasion.

IV. Committees shall not take up any matter, unless referred to them by the Society; and no decision on the merits of any question referred to the committee shall be made after eleven o'clock.

V. All committees shall be summoned, and the matters referred to them shall be specified in the respective summonses; and when any matter is referred to any of the committees of this Society, the mover thereof shall be summoned to attend such committee when the same is taken into consideration.

VI. All committees shall have power to adjourn themselves as they think fit; and, notwithstanding particular gentlemen are named for each committee, every member is of every committee.

VII. If a member shall signify to the Secretary his intention to attend any committee, he shall be summoned to it; and

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and the Secretary shall be directed to summon such other members and other persons as the chairman apprehends to be most conversant in the business to come before them; which business also shall be declared in the summons: And three members shall constitute a committee.

VIII. In order that every member may be the better informed of the times of the meetings of the several committees, in general cases they are fixed in the following manner:

Committees of Correspondence and Agriculture, on Monday.
Colonies and Trade, and Manufactures, on Tuesday.
Mechanics, on Thursday.
Polite Arts, on Friday.
Chemistry, on Saturday.
Accounts, in the first week in every month.

IX. It is the duty of a chairman to observe that no question be put to the committee, unless three members are present; and, before an adjournment of such committee, or report concluded, that the minutes be read, and signed by the chairman, who shall certify that three members at least were present. And the chairman is requested to attend the reports of the committee in which he presided, when such reports are made to the Society.

X. The chairman shall take care that regular meetings of the committee be appointed, and that their reports be made, fairly written, and without blanks, so soon as any one or more of the subjects referred for their consideration have been disposed of; or when they may deem it requisite to gain further directions from the Society; but in case upon appointment of a committee, a sufficient number do not attend, the chairman is required to appoint another day, and shall direct the Secretary to summon the Committee

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on a future day, at a distance of not less than three days inclusive.

XI. There shall be constantly hung up in the Society's room and committee-room, a list of all committees, specifying the business they are to consider, and the days they are appointed to meet.

XII. No pecuniary or other reward shall be given to any candidate for a premium or bounty, for his trouble or attendance on any committee, to whom such matter shall be referred by the Society for their consideration, unless by order of the Society.

XIII. All references to the several committees shall be entered in the respective committee-books, in one list, at the beginning of such books, in order that the subjects of them may be regularly taken up.

XIV. Lists of reports that are ready to be made, or standing for confirmation, with their dates, shall always be hung up in the great room.

XV. Every committee shall direct the Secretary to write to one or more of the persons subscribing any certificate in claim of a premium in Great Britain, or to such other person as the committee may think proper, for a further information of the truth of such certificate, and shall wait for an answer as to the reality of their having signed the same, before the adjudication of such premium.

SECT. XII.

Of Rewards.

I. The chief object of the attention and encouragement of the Society, in the application of their rewards, are ingenuity

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ingenuity in the several branches of the polite and liberal arts; useful inventions, discoveries or improvements in agriculture, manufactures, mechanics, and chemistry; or the laying open any such to the public; and in general all such useful inventions, discoveries, or improvements, as may appear to have a tendency to the advantage of trade and commerce.

II. The Society reserve to themselves the power of giving in all cases, such part only of any premium as the performance shall be judged to deserve, or reserving the whole if there be no merit.

III. The premiums of the Society shall extend to Great Britain and Ireland, and all the British Isles.

IV. No member of this Society shall be a candidate for, or entitled to receive any premium, bounty, or reward whatsoever; except only the honorary medal of the Society. And no member having delivered in his claim for any premium offered by the Society, and afterwards withdrawn the same, shall be entitled to take a part in the deliberations, or vote on the claims of other candidates who may have claimed such premium.

V. No member who is a candidate for the honorary premium or medal of this Society, shall be of the committee to which such matter may be referred; or ever present at their sittings, while the subject is under consideration, unless called in to answer such questions as the committee may propose; nor shall any such candidate be present in the Society when the matter is before them, whether in debate, or for determination, unless called in. Which rules, all members being such candidates, are strictly to observe, under penalty of forfeiting their title to such medal, notwithstanding any determination of the Society in their favour.

VI. If

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VI. If any member shall be afterwards found to have transgressed the rules mentioned in the preceding resolutions, by the means of a borrowed or fictitious name, such member shall be expelled the Society.

VII. No member who is the father, son, or master of a candidate for a premium, bounty, or reward, nor any person any-wise lucratively interested in such an event, shall be of the committee to which such matter is referred; nor present in the Society when it is under consideration, unless called in, under penalty of excluding such child, father, scholar, apprentice, or servant, from all title to any such premium, bounty, or reward, notwithstanding a determination of the Society in their favour.

VIII. A candidate for a premium, or person applying for a bounty, being detected in any disingenuous methods to impose on the Society, shall forfeit any such premium or bounty, and be deemed incapable of obtaining any for the future.

IX. No candidate who is not a member, shall be present at any of the meetings of the Society or committees, or admitted at the Society's rooms, after they have delivered in their claims, till such claims are adjudged, unless summoned by the committee, under forfeiture of the premium or bounty for which they are candidates.

X. No machine, or model of a machine, shall be admitted to claim a premium, unless the whole and every part thereof, shall be delivered into the Society's office at or before the time appointed by the Society. And if any candidate shall secretly make addition to, or alteration in his machine or model, otherwise than by repairing and putting the several parts together, after it is lodged with the Society, he shall on discovery be deemed incapable of receiving any premium.

XI. The

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XI. The Society shall, whenever they think proper, desire the assistance of such gentlemen, manufacturers, or others, though not members of it, as shall be deemed best able to judge of, and discover the truth and value of any matter or thing for which a premium has been claimed.

XII. No medal, or sum of money, shall be given as a bounty or reward for any thing not mentioned in the list of premiums at any time, unless fifteen members are present; and the majority to bestow such medal or sum of money, shall consist of two-thirds at least of the members then present; the same to be confirmed by ballot.

XIII. If a claim for a premium shall be rejected by the Society, no motion shall be made for giving to the candidate, in lieu of such premium, any bounty of equal honour or value with the premium offered.

XIV. Every person who shall receive any premium or bounty from the Society, shall relinquish all pretensions to a patent for any matter for which he has obtained such premium or bounty. No model or machine, for which a patent has been obtained, or is proposed to be obtained, shall be admitted into the repository of the Society.

XV. No member who has obtained a patent for any article similar to such as may be produced to the Society, shall be allowed to vote either in the committee or Society on that subject.

XVI. If any reward be conditionally voted by the Society, and the imposed conditions be not completed within one year from the time of such vote, the reward is to be considered as void, unless further time shall be granted by the Society for complying with the said conditions, in consequence of an application in writing made by or from the said claimant.

XVII. The

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XVII. The several candidates and claimants to whom the Society shall adjudge premiums or bounties, are to attend at the Society's house in the Adelphi, on the last Tuesday in May of that session, at eleven in the morning precisely, to receive the same; that day being appointed by the Society for the Distribution of their Rewards; and before that time no premium or bounty will be delivered, except to those who are about to leave the kingdom.

In cases where the Society may think fit to admit excuses for not attending in person, deputies may be substituted to receive the rewards, provided such deputies are either members of the Society, or superior officers thereof.

At the annual distribution of the Society's Rewards, no member shall be at liberty to give tickets for the admission of more than two ladies and one gentleman, as auditors at the distribution of premiums.

The tickets to be issued from the Secretary's office, and signed by the member who gives them; and not more than one individual to be permitted to attend as a visitor on that day for each order or ticket of admission.

SECT. XIII.

Resolutions.

I. THAT all models of machines, for which persons obtain premiums or bounties, shall become the property of the Society, and correct written descriptions be furnished with them; and where machines are rewarded, that complete models, or correct drawings, and proper written explanations, be delivered to the Society by the persons entitled to such rewards.

II. All

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II. All the written accounts, for which any premium is offered and given, or for which the Society have given a bounty, shall be published; such accounts being first referred to a committee to prepare them for publication.

III. With the list of premiums, an account of all the medals, premiums, and bounties, which have been given by the Society the preceding year, to whom and for what purposes, shall be printed annually.

IV. In the list of the members, after the name of each member, his addition and place of abode are to be inserted.

V. The committee of correspondence are at liberty from time to time, to refer such letters as they esteem proper to the respective committees, without reporting them to the Society, in order to be referred to such committee; except such as propose the granting any new premium or bounty.

VI. All the books of the proceedings, correspondence, &c. of the Society, shall be kept in the Society's office to be inspected by members at any reasonable hour; the house-keeper having for that end a key to the presses.

VII. Members wishing to obtain copies of papers belonging to the Society, shall give a list of such papers as they want, which lists shall be read by the Secretary.

VIII. That no book be purchased for the library of the Society, until it has been recommended by the committee most competent to judge of its merits and usefulness.

IX. No member is to be permitted to borrow from the library more than either one folio, one quarto, or two octavo or 12mo. volumes at one time; but that this liberty shall not be construed to extend to manuscripts, the Transactions of literary and other politic bodies, lexicons, or dictionaries, which shall on no account be lent out of the library.

No

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No member is to be permitted to keep any book longer than fourteen days.

A book is to be provided by the housekeeper in which the titles of the books borrowed, with the names of the person borrowing the same, shall be inserted by the member who borrows such books, and when they are returned, countersigned by the housekeeper.

That such book of the housekeeper be laid before the chairman of the Miscellaneous Committee at every meeting thereof, in order that it may be seen that the above regulations be properly attended to.

X. No person shall be permitted to make any sketches, finished drawings, or paintings, from any statues, busts, casts, drawings, prints or pictures in the Society's possession, without leave first obtained from the Society.

XI. That the Society do not, under the notion of varnishing, touching, or on any account whatever, suffer any painter to meddle with the series of pictures in the Great-room.

XII. That for the better regulation of the dealings of the Society with tradesmen and others, all persons having any claims on the Society, be in future directed to send in an account of their demands once in every three months from the time of their accruing; and the committee of accounts shall at their next monthly meeting inspect such demands, and report upon them to the Society, when the bills recommended for payment, upon such recommendation being confirmed by the Society, shall be discharged at the ensuing monthly meeting of that committee, by the joint drafts of the chairmen on the Bank of England, or by part of the money remaining in the Collector's hands, as the said committee or either of its chairmen shall direct.

N. B.

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N. B. To persons inclinable to leave a sum of money to this Society by will, the following form is offered for that purpose:

ITEM, I give and bequeath unto A B and C D, the sum of upon condition, and to the intent, that they or one of them, do pay the same to the collector, for the time being, of a Society in London, who now call themselves *The Society for the Encouragement of Arts, Manufactures, and Commerce;* which said sum of I will and desire may be paid out of my personal estate, and applied towards carrying on the laudable designs of the said Society.

PAPERS

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PAPERS referred to.

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Mechanics.	Mechanics.
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(BB)

No. 18

RECEIVED of
the sum of being his
contribution to the *Society for the Encouragement of Arts, Manufactures, and Commerce*, for one year from

£. VICE-PRESIDENT.

No. 18

RECEIVED of
the sum of being his
life contribution to the *Society for the Encouragement of Arts, Manufactures, and Commerce.*

£. VICE-PRESIDENT.

SIR, (C)

I AM directed to inform you, that your annual subscription of has been in arrear since the day of and as it is of consequence for the Society to know what sums of money they can bestow in premiums, you are requested to order the payment of it.

By order of the Society,

COLLECTOR.

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(D)

SIR,

I HAVE the honour to acquaint you, that on this day you were elected a Member of the *Society for the Encouragement of Arts, Manufactures, and Commerce*; and as, by their Rules and Orders, every person on his election is to pay his subscription-money, and is not confirmed a member till such subscription be paid, you are requested to order the said payment to be made to the Collector.

I am, Sir, your very humble Servant,

ADELPHI, SECRETARY.
February, 1812.

Printed by Order,
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XIV. A Box containing 32 Mexican Medals, by the Viceroy of Mexico. See page 207.

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A

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OF

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Z

P Zenobio, Right Hon. Count Alvise

*** His Royal Highness PRINCE AUGUSTUS FREDERIC, DUKE OF SUSSEX, K.G. was this Session elected a Member of the Society.

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Titford, Isaac, M.D. *Spanish Town, Jamaica*
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Berezy, William, Esq. *of York and Berezy, in Upper Canada*
Edelcrantz, the Chevalier, A. N. *Sweden*
Vitoftoff, his Excellency Mr. Alex., *Petersburgh*
Deriaben, Mr. Andrew, *ditto*
Titford, William Jowett, Esq. *Spanish Town, Jamaica*
Mac Rea, Alexander, Esq. *Demarara*
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The Plate, No. 2, of the Section of Mr. Jones's temporary Corn Rick, and of Mr. Waistell's improvement of the Dibble for planting Acorns, to face page 60.

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The Plate, No. 9, of Mr. G. Prior's Remontoire Escapement, and Mr. R. Bridgen's Mask for Gilders on Metal, to face page 134.

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CHARLES EARL OF ROMNEY,

F. R. S.

Late a Vice President of the Society instituted for the Encouragement of Arts, Manufactures, & Commerce.

Engraved by W. Bromley from an original Painting by Sir Wm. Beechey in the Possession of the Marine Society.

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TRANSACTIONS

OF THE

SOCIETY,

INSTITUTED AT LONDON,

FOR THE

ENCOURAGEMENT

OF

ARTS, MANUFACTURES,

AND COMMERCE;

WITH THE

Premiums offered in the Year 1812.

VOL. XXX.

LONDON:

PRINTED BY R. WILKS, CHANCERY-LANE.

Sold by the HOUSEKEEPER, at the SOCIETY'S HOUSE, in the ADELPHI; and by Messrs. J. WHITE, BECKET, JOHNSON, CADELL and DAVIES, PHILLIPS, WALTER, RICHARDSON, LONGMAN and REES, NORNAVILLE & FELL, and TAYLOR.

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MDCCCXIII.

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PREFACE.

IN the present Volume, the Society have paid a tribute of respect to the memory of the late EARL of ROMNEY, by prefixing his Portrait, engraved by Mr. WILLIAM BROMLEY, from an original painting, by Sir WILLIAM BEECHEY, in the possession of the *Marine Society*.

The late EARL of ROMNEY became a Member of the Society, in the year 1762, and was elected a Vice-President in 1771, on the death of George Eckersall, Esq.; his Lordship was an annual contributor of Five Guineas to the Society.

From this nobleman's family the Society have received great patronage and pecuniary support. His father was their second President, and in their proceedings of March 29, 1754, immediately on the formation of the Society, the following minute is entered: "Lord Romney and "Lord Folkstone were so generous as to declare, that

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"whatever deficiences shall be in the Premiums for this "year, they will supply themselves; for which they had "the thanks of the gentlemen present."

The arrangements of the present Volume are placed in their usual order; Agriculture takes the precedence; and the communications on the subjects connected therewith, will be found numerous and interesting. Dr. H. AINSLIE, though engaged in an extensive professional practice, has long paid attention to the improvement of a large tract of barren land, in Lancashire, by planting it with Timber Trees; and has this session received the Gold Medal of the Society, for 151,240 Forest Trees, lately added to his plantations.

The Rewards of the Society are not confined to Great Britain, but extended to the whole united empire; and a Gold Medal has been adjudged to JOHN AUSTIN, Esq. of Grange, in Ireland; for gaining there upwards of three hundred Acres of Land from the Sea.

Dr. FRANCIS HAGGITT, D. D. of Durham, has shewn a commendable spirit, by improving fifty Acres of Land, previously barren and waste, and not freehold; and has rendered it capable of producing excellent crops of corn; he has been honoured with the Gold Medal.

Major BRYAN HESLEDEN has displayed much skill and

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and judgement, in draining a Morass of twenty-one Acres, which is now converted into firm Arable Land; and though his improvements did not come under the form of a regular claim upon the Society, yet the Lesser Silver Medal was voted to his merit.

Mr. MOGGRIDGE's communication on the growth of his Forest Trees, contains information highly interesting to Planters, and affords great encouragement for similar pursuits; he has been honoured by the Society with their Lesser Silver Medal.

To JOHN CHRISTIAN CURWEN, Esq. the Lesser Gold Medal has been voted for extensive experiments made by him on the feeding of Milch Cows with warm food, by which means not only the quantity, but also the quality of their milk, have been greatly improved.

Much confusion has occurred amongst Agriculturists, respecting what has been called Winter-Wheat and Spring-Wheat, and the same kind of grain has frequently been used for sowing Land in Winter and in Spring. Within a few years, farmers have discriminated some kinds of wheat, as answering better for sowing in the Spring season than others; but errors have frequently arisen respecting the species best calculated for the purpose.

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This matter appears now to be clearly put out of doubt, by the valuable communication of Mr. SKURRAY, who has ascertained by a series of experiments, that the species of wheat named by him Summer-Wheat, has more rapid powers of vegetation than any other yet known; that its produce is great, and the flour from it excellent. He has been complimented with the Society's Silver Medal.

The preservation of Butter during hot weather, or in warm climates, is very difficult. To effectuate this purpose, Mr. ARTHUR HODGE has invented an earthen vessel, in which the Butter is to be placed, and kept cool by the evaporation of a small quantity of water, poured into a porous earthen cover, and percolating from thence equally and gradually over the surface of the butter-pot. The Society have voted to him the sum of Ten Guineas.

Mr. OGDEN's Instrument for Pruning Young Trees, will be found very useful in plantations. He was rewarded with Ten Guineas for this Invention.

The Butter Churn of Mr. SAMPSON displays much mechanical skill in its construction; churning is usually regarded as a very laborious operation, but Mr. SAMPSON has contrived in his Churn to regulate the force, and to apply it with the greatest ease and advantage.

Mr.

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Mr. BRAITHWAITE hath, with a moderate income, made very spirited improvements by Planting Forest Trees, with a view to excite a similar spirit of industry amongst persons possessing small estates. The Society have presented to him their Lesser Silver Medal.

In the Class of Chemistry, Mr. WILSON's ingenious contrivance of a Composition to answer the common purposes of Portland-Stone Chimney-Pieces, is described, for which he received a reward of Twenty-five Guineas.

The Thanks of the Society were voted to H. B. WAY, Esq. for Experiments in Potatoe Bread conducted under his direction; the Bread sent by him to the Society, made from a mixture of Wheat Flour and Potatoes, appeared to possess every desirable property, and to retain its goodness a longer time than wheaten bread.

To the CORK INSTITUTION the Society are indebted for some valuable Specimens of Irish Marbles, which now form a part of the decorations of their Great Room.

Under the Class of Polite Arts are detailed two communications from Mr. CATHERY. The first, his process for fixing Chalk Drawings, for which he was adjudged

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the sum of Twenty Guineas; the other, his method of making Paper Transparent, and to bear common Ink, for which the sum of Five Guineas was voted to him.

In the Class of Manufactures, a very elaborate Engraving is given of a Machine noticed in the 23d Volume of the Society's Transactions, invented for the purpose of crooking and cutting Wires for Cards employed in carding Cotton and Wool. The difficulty of making a proper explanatory drawing, at the time it was rewarded, prevented an engraving being then given. The present engraving will show the ingenuity of the artist, and the merits of the machine.

The desire of improving the quality of English Wool, induced the Society to offer a premium of a Gold Medal for the accomplishment of this object; it was adjudged to Mr. SHEPPARD for his valuable communication.

Frequent public complaints having been made, that the Canvas employed by the British Navy was not equal in quality to that used in Dutch and French Ships of War, the Society were anxious to prove, that our manufacturers are competent to produce as good, or better Sail-

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Sail-cloth, which is evinced by the specimens in the Society's possession, manufactured by Messrs. R. & G. CAYME, to whom the Gold Medal was adjudged.

Many improvements and inventions in the Class of Mechanics have as usual been rewarded by the Society.

To alleviate the miseries of the distressed must afford to every feeling mind uncommon satisfaction. The ingenious Apparatus invented by Mr. COOKE, by means of which a Blind person may not only become a proficient in Music, but instruct others who are blind, or teach persons who have their sight, must open a source of comfort to those afflicted with so serious a calamity. The Gold Medal has been voted to Mr. Cooke.

To lessen the pain attending surgical operations, and to facilitate their execution, is of great importance; the Machine contrived by Mr. MACHELL, combines the advantages as well of being usefully employed in surgery, as of application of its principle to mechanical improvements. He was rewarded with the Gold Medal.

When a calculation is made of the large quantity of provisions annually consumed by Rats and other vermin, the

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the necessity of adopting every possible means for their destruction is obvious. The Trap invented by Mr. Bowler displays much mechanical skill in its construction, and to use his own words, it will, by proportioning its size, " take and retain any animal from a Mouse to " a Lion." The sum of Ten Guineas was presented to him.

The Silver Medal and Fifteen Guineas were voted to Mr. Perry, for his invention of an Instrument to direct the Hand so as to write with ease and elegance, and he produced some fine Specimens of writing thus executed by his young pupils.

The losses and inconveniences daily experienced by small Shopkeepers and others who know little of accounts, must be evident to every person, and be a strong recommendation of Mr. Goss's very ingenious Instrument to work Addition of Numbers with accuracy and dispatch. He was rewarded with the Silver Medal and Fifteen Guineas.

The common method of placing upright Scaffold Poles in the streets, for the repairs of Houses, occasions many obstructions to foot-passengers, and is attended with a heavy expense. The simple and effective temporary

Scaffold

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Scaffold invented and employed by Mr. DAVIS appears to answer every desirable purpose, comparatively at a very trifling expense, and without annoyance to foot passengers. The Society's Silver Medal was voted to him.

The great sufferings of a Horse when fallen within the shafts of a loaded cart, have excited the feelings of Mr. MARTIN, who hath taken great pains to obviate the mischief. For his endeavours the Society have voted to him the sum of Ten Guineas.

The many diseases which Shoe and Bootmakers experience from pressing their work against the stomach or breast, have induced the Society at various times to reward Machinery invented to prevent such mischief. Mr. KING has this Session been rewarded with Ten Guineas, for a cheap and ingenious contrivance which appears to possess every desirable advantage for the purpose.

Twenty Guineas have this Session been voted to Mr. RITCHIE for a Compensation Pendulum to prevent the rate of a Clock from varying by heat or cold. He has displayed much ingenuity in its construction, and simplicity in its adjustment.

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The blessings of health are in a great degree procured by cleanliness, and many diseases prevented by an attention to this simple circumstance. The expense of common Baths in private families has been a prohibition to the practice of bathing, but it is probable that the Bath lately invented by Dr. CUMMING, will unite all the advantages that can be derived from Bathing, and at a very trivial expense. The Certificate from the Denbigh Dispensary proves that it has been used to a considerable extent, and met with great approbation. The Society have complimented Dr. CUMMING with their Silver Medal.

In the Class of Colonies and Trade it appears from Dr. ROXBURGH's Communications to Mr. J. AMOS, that the article Caoutchouc, or Indian Rubber, which has hitherto been only imported from the Brazils, can be procured from our East India Colonies in any quantity. Numerous experiments are making on this valuable article in many branches of business, and its consumption is likely to be considerable.

Various opinions have arisen on the methods most likely to answer for the preservation of plants on Shipboard, and by a consideration of the advantages or disadvantages attending the method employed there, improvements

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ments will naturally arise; the Society in the present Volume have collected much information upon the subject from various countries and climates, and submit the communications without comment to the opinion of the Public.

The Teak Tree of Pegu is employed in the East Indies for Ship-building, and for the same purposes that Oak is used in England. It is probable that this valuable tree may be cultivated to advantage both in our African and West India Colonies. The communication of its mode of culture as drawn up by Dr. ROXBURGH, of Calcutta, appears to contain every information necessary for this desirable purpose.

It is of importance to the united Kingdom to form a mutual intercourse between our East and West India Colonies, that the natural products of each may be participated in common, to the benefit of both. The Communication from Dr. ANDERSON of St. Vincent, mentions the Sago plants in his possession to be in a very flourishing state there, and that the fruit of the Gardenia Florida may probably form a useful Yellow Dye.

The Society take the present opportunity of making their acknowledgments to the Public Bodies and individuals

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duals for the Presents received from them, as recorded in this Volume.

Their Library has received a valuable addition of Books from Donations and Purchases, and great improvements have been made in the disposition of the Models in their Repository.

The Society have great pleasure in announcing the flourishing state of their finances, and stating, that probably no other Institution produces upon similar terms so many advantages to the Members and to the Public.

With a view to prevent unnecessary repetition in the Communications of their Correspondents, and to avoid the introduction of extraneous matter, the Society have considerably abridged many of the Papers sent them; and they desire it to be clearly understood, that as a Body they are not responsible for any opinion or representation of facts contained in the following Pages.

Adelphi, Dec. 9, 1812.

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PREMIUMS

OFFERED IN THE YEAR 1812.

BY THE SOCIETY

INSTITUTED FOR THE ENCOURAGEMENT

OF

ARTS, MANUFACTURES, AND COMMERCE,

IN THE ADELPHI, LONDON.

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The Meetings of the Society are held at their House in the Adelphi, London; and the Consideration of the Claims, offered in the present List, will take place, during the Session of the Society, commencing on the 28th of October, 1812.

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PREMIUMS offered in 1812, *by the* SOCIETY *instituted at* London, *A. D.* 1754, *for the Encouragement of Arts, Manufactures, and Commerce, with a List of the present Officers.*

PRESIDENT.

Charles, Duke of Norfolk, F. R. and A. S.

VICE-PRESIDENTS.

John Duke of Bedford, F. A. S.
Hugh, Duke of Northumberland, F. R. and A. S.
G. G. L. Marquis of Stafford, K. G.
Jacob, Earl of Radnor, F. R. and A. S.
Robert, Earl of Liverpool, F. R. S.
Charles, Earl of Romney, F. R. S.
Hon. Robert Clifford, F. R. and A. S.
Sir William Dolben, Bart. L. L. D.
Sir Robert Peel, Bart. M. P.
Sir Watkin Lewes, Knt.
Thomas Pitt, Esq. F. A. S.
Richard Clark, Esq. Chamberlain, F. A. S.
Nathaniel Conant, Esq.
Richard Powell, M. D.
John Christian Curwen, Esq. M. P.
Richard Wilson, Esq. F. A. S.

CHAIRMEN OF COMMITTEES.

Accounts.

William Lumley, Esq.
Abraham Osorio, Esq.

Correspondence and Papers.

William Tooke, Esq.
Edward Bancroft, M.D. F.R.S.

Polite Arts.

J. Barber Beaumont, Esq. F.A.S
R. H. Solly, Esq. F. R. and A. S.

Agriculture.

Matthias Deane, Esq.
T. H. Andrew, Esq.

Manufactures.

J. Pearsall, Esq.
J. Trelawney, Esq.

Mechanics.

J Kenworthey Cooke, Esq.
Thomas Gill, Esq.

Chemistry.

Henry Coxwell, Esq.
G. D. Midgley, Esq.

Colonies and Trade.

William Lewis, Esq. F. L. S.
William Vaughan, Esq.

Miscellaneous Matters.

William Kirkby, Esq.
Daniel Beaumont, Esq.

SECRETARY, Charles Taylor, M. D.
ASSISTANT SECRETARY, Mr. Thomas Woodfall.
HOUSEKEEPER, Miss A. B. Cockings.
COLLECTOR, Mr. Robert Elwin,

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ADVERTISEMENT TO THE PUBLIC.

THE Chief objects of the SOCIETY are to promote the Arts, Manufactures, and Commerce of this Kingdom, by giving honorary or pecuniary Rewards, as seems to them best adapted to the case, for all such useful Inventions, Discoveries, and Improvements, (though not mentioned in this book) as tend to that purpose; and, in pursuance of this plan, the Society have already expended above FIFTY THOUSAND POUNDS, advanced by voluntary subscriptions of their members, and legacies bequeathed.

The Register of the Premiums and Bounties they have given, which may be seen at the SOCIETY's house in the *Adelphi*, will show the very great advantages which the Public have derived from this Institution.

The meetings of the SOCIETY are held every *Wednesday*, at seven o'clock in the evening, from the fourth *Wednesday* in *October* to the first *Wednesday* in *June*. The several Committees meet on other evenings in the week during the session, as particularly mentioned in their printed book of Rules and Orders.

In order still farther to promote the laudable Views of the SOCIETY, it may be necessary to explain the mode by which members are elected.

Each member has the privilege, at the meetings of the SOCIETY, or by letter to the Secretary, to propose any person who is desirous to become a member, provided the proposal contains the name, with the full addition, and place of abode, of the proposed member, and is signed by three members of the SOCIETY.

Peers of the Realm or Lords of Parliament are, on their being proposed, immediately balloted for; the names of other persons proposed to become Members are to be delivered to the Secretary, read at the next meeting of the SOCIETY, and then inserted in lists which are hung up in the Society's room: they are balloted for at the second following ordinary meeting. In both cases, if two-thirds of the members then voting ballot in their favour, they are deemed perpetual members upon payment of not less than Twenty Guineas in one sum, or subscribing members upon payment of any sum not less than Two Guineas annually.

All members are entitled to vote and assist in all the business of the SOCIETY and the several Committees. The members have also the privilege of recommending two persons as auditors at the meetings of the SOCIETY, and by addressing a note to the housekeeper, of introducing their friends to examine the various Models, Machines, and Productions, in different branches of Arts, Manufactures, and Commerce, for which rewards have been bestowed; also to inspect the magnificent series of moral and historical Paintings, executed by the late J. BARRY, Esq. which, with some valuable Busts, Statues, &c. decorate the Great Room.

Members have the use of the Society's Library, which is valuable and annually increasing, from donations of scientific and useful books and engravings. The SOCIETY are highly sensible of the great importance of such acquisitions, and are happy to record them, with the names of the donors, in the Volume annually published of the SOCIETY's Transactions, to which the members are entitled.

Ladies are eligible, as members of the SOCIETY, to all the Privileges thereof, and are alone entitled to vote by proxy at elections, through the medium of any gentleman who is a member, on his producing a written authority for the same.

The time appointed for admission to the Paintings or Models, is from ten to two o'clock, Sundays and Wednesdays excepted.

ORDERED, SOCIETY'S HOUSE, ADELPHI, JUNE 1st, 1812.

That the several Candidates and Claimants, to whom the Society shall adjudge Premiums or Bounties, do attend at the Society's House in the Adelphi, on the last Tuesday in May, 1813, at eleven o'Clock in the Morning precisely, to receive the same; that Day being appointed by the Society for the Distribution of their Rewards: And before that time no Premium or Bounty will be delivered, except to those who are about to leave the Kingdom.

In cases where the Society may think fit to admit excuses for not attending in person, deputies may be substituted to receive the Rewards, provided such Deputies are either Members of the Society, or superior Officers thereof.

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PREMIUMS IN AGRICULTURE.

The candidates for planting all kinds of trees are to mention the nature of the soil, to produce certificates that the respective plantations are properly fenced and secured, and particularly to state the condition of the plants at the time of signing such certificates. Any information which the candidates for the following premiums may choose to communicate, relative to the methods made use of in forming the plantations, or promoting the growth of the several trees, or any other observations that may have occurred on the subject, will be thankfully received.

It is the intention of the Society, that such lands only as are not calculated for the purposes of Husbandry, should be employed for the purposes specified in these advertisements relative to plantations.

Article 1. Acorns.

FOR having set between the first of October, 1810, and the first of April, 1811, the greatest quantity of land, not less than ten acres, with acorns, with or without seeds, cuttings, or plants of other trees, at the option of the candidate; and for effectually fencing and preserving the same, in order to raise timber; the gold medal.

2. For the second greatest quantity of land, not less than five acres, set agreeably to the above conditions; the silver medal.

Certificates of setting agreeably to the above conditions, and that there are not fewer than three hundred young oaks on each acre, to be delivered to the Society on or before the first Tuesday in December, 1812.

3. Raising Oaks. To the person who shall have raised, since the year 1808, the greatest number of oaks, not fewer than five thousand, either from young plants or acorns, in order to secure a succession of oak timber in this kingdom; the gold medal.

4. For the next greatest number, not fewer than three thousand; the silver medal.

Certificates that there were on the land, at least the number of young oak trees required, in a thriving condition, two years after the planting, with an account of the methods pursued in making and managing the plantation, to be produced to the Society on or before the first Tuesday in January, 1813.

5. Ascertaining the best Method of raising Oaks. To the person who shall ascertain in the best manner, by actual experiments, the comparative merits of the different modes of raising oaks for timber, either from acorns set on land properly dug or tilled, from acorns set by the spade or dibble, without digging or tillage, either on a smooth surface, or among bushes, fern, or other cover: or from young plants previously raised in nurseries, and transplanted; regard being had to the expense, growth, and other respective advantages of the several methods; the gold medal.

The *accounts* and proper *certificates*, that not less than one acre has been cultivated in each mode, to be produced to the Society on or before the first Tuesday in November, 1812.

6. Chesnuts. For having sown or set, between the first of October 1810, and the first of April, 1811, the greatest quantity of land, not less than six acres, with Spanish chesnuts, with or without seeds, cuttings, or plants of other trees, adapted to such soil, at the option of the candidate; and for effectually fencing and preserving the same, in order to raise timber; the gold medal.

7. For the second greatest quantity, not less than four acres; the silver medal.

Certificates of sowing or setting, agreeably to the above conditions, and that there are not fewer than three hundred chesnut plants in a thriving state, on each acre, to be delivered to the Society on or before the first Tuesday in January, 1813.

8. Elm. For having planted the greatest number of the English elm, not less than eight thousand, between the twenty-fourth of June, 1810, and the twenty-fourth of June, 1811; and for having effectually fenced and preserved the same in order to raise timber: the gold medal.

9. For the second greatest number, not less than five thousand; the silver medal.

Certificates of having planted agreeably to the above conditions, that the plants were in a healthy and thriving state two years at least after making the plantation, and specifying the distance of the plants, to be delivered to the Society on or before the first Tuesday in April, 1813.

10. Larch. For having planted out, between the twenty-fourth of June, 1809, and the twenty-fourth of June, 1810, the greatest number of larch trees, not fewer than five thousand, and for having effectually fenced and preserved the same in order to raise timber; the gold medal.

11. For the next greatest number, not fewer than three thousand; the silver medal.

Certificates of the number of plants, that they were in a healthy and thriving state two years at least after they were planted out, with a general account of the methods used in making the plantation, to be delivered to the Society on or before the last Tuesday in December, 1812.

N. B. The larch trees may be planted either mixed with other trees, or by themselves, as may best suit the convenience of the planter.

12. Ash. For having sown or set, in the year 1808, the greatest quantity of land not less than six acres, with ash for timber, with or without seed, cuttings, or plants, of such other trees as are adapted to the soil; the gold medal.

13. For the next greatest quantity, not less than four acres; the silver medal.

Certificates of the sowing or setting, agreeably to the above conditions, that there are not fewer than six hundred ash plants on each acre, in a thriving and healthy

condition; two years at least after the sowing or setting, with a general account of the methods used in making the plantation; to be delivered to the Society on or before the last Tuesday in December, 1812.

14. Forest trees. To the person who shall have enclosed and planted, or set, the greatest number of acres (not less than ten) of land, that is incapable of being ploughed, such as the borders of rivers, the sides of precipices, and any land that has too many rocks, or that is not calculated to repay the expense of tillage, owing to the surface being too hilly, mountainous, or otherwise unfit for tillage, with the best sorts of forest trees, namely, oak, Spanish-chesnuts, ash, elm, beech, alder, willow, larch, spruce, and silver fir, with or without screens of Scotch fir, adapted to the soil, and intended for timber trees, between the first of October, 1809, and the first of April, 1810; the gold medal.

15. For the second greatest quantity of land, not less than seven acres; the silver medal.

A particular *account* of the methods used in making and managing the plantations, the nature of the soil, the probable number of each sort of plants, together with proper *certificates* that they were in a healthy and thriving state two years at least after making the plantation, to be delivered to the Society on or before the first Tuesday in December, 1812.

N. B. With the above forest trees, the seeds, cuttings, or plants, of such other trees as are adapted to the soil, and proper for underwood, may or may not be intermixed.

16. Norway Fir Seedlings. To the person who shall have planted in the united kingdom, during the year 1812, the greatest number, not less than two thousand, of red wood and white wood, Norway fir seedlings, at sufficient distances from each other to stand for timber trees; the gold medal.

Certificates of the number of plants, that they were in a thriving state two years at least, after they were planted out, with a general account of the method used in making the plantation, to be delivered to the Society on or before the first Tuesday in December, 1815.

N. B. It is recommended to plant the seedlings of about three or four years growth and in a moderately good soil, somewhat sheltered; the wood from the district of Christiana is esteemed the best for carpenters and joiners use; and for spars and upers the trees near to Long Sound, are most valued.

17. Walnut-Trees. For having planted the greatest number of walnut trees, not less than five hundred, between the 24th of June, 1810, and the 24th of June 1811, and for having effectually fenced and preserved the same, in order to raise timber; the gold medal.

18. For the next greatest number, not fewer than three hundred; the silver medal.

Certificates of having planted agreeably to the above conditions, and that the plants were in a healthy and thriving state, two years at least after making the plantations, and specifying the distance of the plants from each other, to be delivered to the Society, on or before the first Tuesday in April, 1813.

19. Securing Plantations of Timber Trees and Hedge Rows. To the person who shall give to the Society the most satisfactory account, founded on experience of the most effectual and least expensive method of securing young plantations of timber trees, and hedge rows, from hares and rabbits, as well as sheep and large cattle, which at the same time shall be least subject to the depredations of wood-stealers; the silver medal.

The *accounts* and *certificates* of the efficacy of the method, to be produced to the Society on or before the first Tuesday in December, 1812.

20. Comparative Culture of Wheat, broad cast, drilled and dibbled. For the best set of experiments, made on not less than twelve acres, four of which to be sown broad-cast, four drilled, and four dibbled, the two latter in equidistant rows, in order fully to ascertain which is the most advantageous mode of cultivating wheat; the gold medal.

It is required that every operation and expense of each mode of culture be fully described: and that proper *certificates* of the nature and condition of the land on which the experiments were made, together with an *account* of the produce of the corn, the weight per bushel, and also of the straw, be produced to the Society on or before the first Tuesday in February, 1813.

21. Beans and Wheat. To the person who shall have dibbled or drilled between the first of December, 1811, and the first of April, 1812, the greatest quantity of land, not less than ten acres, with beans, in equidistant rows, and hoed the intervals twice or oftener, and shall have sown the same land with wheat in the autumn of the year 1811; the gold medal.

It is required that an account of the sort and quantity of beans, the time of dibbling or drilling, and of reaping or moving them, the produce per acre thrashed, the expense or dibbling or drilling, hand or horse hoeing, the distance of the rows, and the quality of the soil, together with *certificates* of the number of acres, and that the land was afterwards actually sown with wheat, be produced on or before the second Tuesday in March, 1812.

22. Beans. To the person who, in the year 1811, shall discover and cultivate, either by the drill or dibbling method, on not less than five acres, a species of horse-beans or tick-beans, that will ripen their seeds before the 21st of August; the silver medal.

It is required that a particular account of the bean, the cultivation, and the expence attending it, with proper *certificates* of the

nature and condition of the land on which the experiments were made, together with an *account* of the produce, the weight per Winchester bushel, and a sample of not less than a peck, be produced to the Society on or before the first Tuesday in December, 1812. It is apprehended that if a bean should be brought into cultivation with the habits of the hotspur, or other early peas, that it would in a great measure escape the danger arising from the collier-insect, or other insects, and allow more time for the farmers to till the land for the subsequent crop of wheat. The *accounts* and *certificates* to be delivered on or before the first Tuesday in December, 1812.

23. Parsnips. To the person who in the year 1811, shall cultivate the greatest quantity of land, not less than five acres, with parsnips, for the particular purpose of feeding cattle or sheep; the gold medal.

Certificates of the quantity of land so cultivated, with a particular *account* of the nature of the soil and weight of the produce on sixteen perches, and also of the condition of the cattle or sheep fed with the parsnips, and the advantages resulting from the practice, to be produced to the Society on or before the second Tuesday in February, 1813.

24. Buck Wheat. To the person who shall cultivate the greatest quantity of land with buck wheat, not less than thirty acres; the gold medal.

It is required that the time of sowing and reaping be noticed; also a particular *account* of the species, cultivation, and expense attending it, the manner of reaping it, thrashing it, and housing the grain; with proper *certificates* of the nature and condition of the land on which the experiments were made, and the name of the crop, if any, which the same land bore the preceding year, together with an *account* of the produce, and a sample of the seed, not less than a quart, be produced to the Society on or before the second Tuesday in January, 1813.

25. For the next greatest quantity, not less than fifteen acres, on similar conditions; the silver medal.

Information respecting its application to the feeding of cattle, hogs, and poultry, and other of its uses, is also desired. It is known to be particularly serviceable in furnishing honey to bees.

26. Bees, Wax, and Honey. To the person who shall erect, previous to the first day of September, 1812, an apiary containing the greatest number of hives or boxes stocked with bees, not less than thirty; the silver medal, or twenty guineas.

27. For the next greatest number, not fewer than twenty stocks; ten guineas.

Proper *certificates* of the number of stocks, and that they have been in the possession of the claimant during the preceding summer, to be produced to the Society on or before the first Tuesday in March, 1813.

It is expected that the claimant will give such particular information on the subject, as may tend to benefit the public, and enable other persons to keep bees to advantage.

28. Raising Grass Seeds. To the person who shall raise the greatest quantity of each of any of the following named grass seeds, *viz.*—Meadow fox-tail (alopecurus pratensis), sweet-scented vernal grass (anthoxanthum odoratum,) Timothy grass (phleum pratense,) meadow fescue grass (festuca pratensis,) smooth-stalked meadow grass (poa pratensis,) rough-stalked meadow grass (poa trivialis;) the silver medal.

It is required that *certificates* from persons who have viewed them in a proper state, to identify that they are one or other of the seeds above-mentioned, indicating clearly the particular species, and noticing the quantity produced of such seeds, free from weeds or mixture of other grasses, together with proper samples of the seeds, be produced to the Society on or before the first day of February, 1813.

29. Preserving Turnips. To the person who shall discover to the Society the best and cheapest method of preserving turnips perfectly sound, and in every respect fit for the purpose of supporting and fattening sheep and neat cattle during the months of February, March, and April; the gold medal.

It is required that a full and accurate *account* of the method employed, and the expense attending the process, together with *certificates* that the produce of four acres at the least have been preserved according to the method described, and applied to the feeding of sheep and neat cattle; that the whole were drawn out of the ground before the first day of February, in order to clear the greater part of it previous to its being prepared for corn, and to save the soil from being exhausted by the turnips; and also of the weight of an average sixteen perches of the crop; be produced to the Society on or before the first Tuesday in December, 1812.

30. For the next in quantity and merit, on not less than two acres; the silver medal.

31. Preserving Cabbages. To the person who shall discover to the Society the best and cheapest method of preserving drum-headed cabbages perfectly sound, and in every respect fit for the purpose of supporting and fattening sheep and neat cattle during the months of February, March, and April; the gold medal.

32. For the next in quantity and merit, on not less than two acres; the silver medal.

Conditions the same as for preserving turnips, Art. 29.—And the *accounts* to be produced on or before the first Tuesday in December, 1812.

33. Preserving Carrots, Parsnips, or Beets. To the person who shall dis-

cover to the Society the best and cheapest method of preserving carrots, parsnips, or beets, perfectly sound, and in every respect fit for the purpose of supporting horses, and fattening sheep and neat cattle, during the months of February, March, and April; the gold medal.

Conditions the same as for preserving turnips, Art. 29.—And the *accounts* to be delivered in on or before the first Tuesday in December, 1812.

34. For the next in quantity and merit, on not less than two acres; the silver medal.

35. Potatoes. To the person who shall, in the year 1812, cultivate the greatest quantity of land which has not been used for the cultivation of potatoes for the space of twelve years past, not less than fifty acres, with potatoes of such qualities as to be fit for the use of the table in the months of April, May and June, after their growth the preceding year; the gold medal, or thirty guineas.

36. For the next greatest number, not less than twenty acres; the silver medal, or fifteen guineas.

Proper *Certificates* along with other necessary particulars, to be delivered in to the Society, on or before the last Tuesday in April, 1813.

37. These premiums are extended one year further, on similar conditions.

38. Preserving Potatoes. To the person who shall discover to the Society the best and cheapest method of preserving potatoes, two or more years, perfectly sound, without vegetating, and in every other respect fit for the purpose of sets and the use of the table, and consequently of supporting and fattening cattle; the gold medal, or thirty guineas.

It is required that a full and accurate *account* of the method employed, and the expense attending the process, with *certificates* that one hundred bushels at the least have been preserved according to the method described, and that one or more bushels of the same potatoes have been set, and produced a crop without any apparent diminution of their vegetative power, and also that they have been used at table, with entire satisfaction to the person who eat of them, together with a sample of one bushel, be sent to the Society on or before the first Tuesday in December, 1812.

39. For the next greatest quantity, not less than fifty bushels; the silver medal.

40. Making Meadow-Hay in wet Weather. To the person who shall discover to the Society the best and cheapest method, superior to any hitherto practised, of making meadow-hay in wet weather; the gold medal.

A full *account* of the method employed, and of the expense attending the process, with not less than fifty-six pounds of the hay; and *certificates* that at least the produce of six acres of land has been made according to the method described, and that the whole is of equal quality with the sample; to be produced on or before the first Tuesday in January, 1813.

41. Harvesting Corn in wet Weather. To the person who shall discover to the Society the best and cheapest method, superior to any hitherto practised, of harvesting corn in wet weather; the gold medal.

A full *account* of the method employed, and of the expense attending the process, with not less than two sheaves of the corn, and *certificates* that at least the produce of ten acres has been harvested according to the method described, and that the whole is of equal quality with the samples, to be produced on or before the first Tuesday in January, 1813.

42. Gaining Land from the Sea. To the person who shall produce to the Society an account, verified by actual experiment, of his having gained the greatest quantity of land from the sea, not less than fifty acres, on the coast of Great Britain and Ireland; the gold medal.

Certificates of the quantity of land, and that the experiments were begun after the first of January, 1807, to be produced to the Society on or before the last Tuesday in November, 1812.

43. The same premium is extended one year further.

Certificates to be produced on or before the last Tuesday in November, 1813.

44. Improving Land lying Waste. For the most satisfactory *account* of the best method of improving any one of the following soils, being land lying waste or uncultivated, *viz.* clay, gravel, sand, chalk, peat earth, or bog, verified by experiments on not less than fifty acres of land; the gold medal.

45. For the next greatest quantity, not less than thirty acres; the silver medal.

It is required, that the land, before such improvement, be absolutely uncultivated, and in a great measure useless, and that, in its improved state, it be enclosed, cultivated, and divided into closes.

Certificates of the number of acres, of the quality of the land so improved, with a full *account* of every operation and expense attending such improvement, the state it is in as to the proportion of grass to arable, and the average value thereof, to be produced on or before the first Tuesday in February, 1813.

46. Manures. For the most satisfactory set of experiments, to ascertain the comparative advantages of the following manures, used as top-dressings on grass and corn land, *viz.* soot, coal-ashes, wood-ashes, lime, gypsum, night-soil, or any other fit article; the gold medal.

It is required that the above experiments be made between two or more of the above-mentioned manures, and that no less than two

acres of land be dressed with each manure.

An *account* of the nature of the soil, quantity, and expense of the manure and crops, with *certificates*, to be produced on or before the last Tuesday in February, 1813.

47. Raising Water for the Irrigation of Land. To the person who shall discover to the Society the cheapest and most effectual method of raising water in quantities sufficient to be beneficially employed for the purpose of irrigating land, superior to, and cheaper than any other method now in use; the gold medal, or fifty guineas.

A model, on a scale of one inch to a foot, with *certificates* that a machine at large, on the same construction, has been used, specifying the quantity of water delivered in gallons per hour, and the height to which it was raised, to be produced to the Society on or before the first of March, 1813.

48. Paring Plough. To the person who shall invent and produce to the Society a machine or plough for the purpose of paring land preparatory to burning, superior to any hitherto known, or in use for such purpose, and to be worked by not more than one man and two horses; the silver medal, or twenty guineas.

The machine, and *certificates* that at least three acres have been pared by it in a proper manner, to be produced to the Society on or before the first of January, 1813.

49. Machine for Dibbling Wheat. To the person who shall invent a machine, superior to any hitherto known or in use, to answer the purpose of dibbling wheat, by which the holes for receiving the grain may be made at equal distances and proper depths; the silver medal and ten guineas.

The *machine*, with *certificates* that at least three acres have been dibbled by it, to be produced to the Society on or before the second Tuesday in January, 1813.

50. Machine for Reaping or Mowing Corn. For inventing a machine to answer the purpose of mowing or reaping wheat, rye, barley, oats, or beans, by which it may be done more expeditiously and cheaper than by any method now practised, provided it does not shed the corn or pulse more than the methods in common practice, and that it lays the straw in such a manner that it may be easily gathered up for binding; the gold medal.

The *machine*, with *certificates* that at least three acres have been cut by it, to be produced to the Society on or before the second Tuesday in December, 1812. Simplicity and cheapness in the construction of this and the preceding machine, will be considered as principal parts of their merit.

51. Thrashing Machine. To the person who shall invent a machine by which corn of all sorts may be thrashed more expeditiously, effectually, and at a less expense, than by any method now in use; the gold medal.

The *machine*, or a model, with proper *certificates* that such a machine has been usefully applied, that at least thirty quarters have been thrashed by it, and of the time employed in the operation, to be produced to the Society on or before the last Tuesday in February, 1813.

52. Destroying the Grub of the Cockchafer. To the person who shall discover to the Society an effectual method, verified by repeated and satisfactory trials, of destroying the grub of the cockchafer, or of preventing or checking the destructive effects which always attend corn, peas, beans, and turnips, when attacked by those insects; the gold medal.

The *accounts*, with proper *certificates*, to be produced on or before the first Tuesday in January, 1813.

53. Destroying Worms. To the person who shall discover to the Society an effectual method, verified by repeated and satisfactory trials, of destroying worms, or of preventing the destructive effects they occasion on corn, beans, peas, or other pulse; the silver medal.

The *accounts*, with proper *certificates*, to be produced to the Society on or before the first Tuesday in January, 1813.

54. Destroying the Fly on Hops. To the person who shall discover to the Society an easy and efficacious method of destroying the fly on hops, superior to any hitherto known or practised, on not less than four acres of hop ground; the gold medal.

Accounts and *certificates* to be delivered to the Society on or before the first Tuesday in February, 1813.

55. Preventing the Blight, or Ravages of Insects, on Fruit Trees and Culinary Plants. To the person who shall discover to the Society the most effectual method of preventing the blight or ravages of insects on fruit-trees and culinary plants, superior to any hitherto known or practised, and verified by actual and comparative experiments; the silver medal.

The *accounts*, with proper *certificates*, to be delivered to the Society on or before the second Tuesday in December, 1812.

56. Cure of the Rot in Sheep. To the person who shall discover to the Society the best and most effectual method of curing the rot in sheep, verified by repeated and satisfactory experiments; the gold medal.

It is expected that the candidates furnish accurate *accounts* of the symptoms and cure of the disease, together with the imputed cause thereof, and the actual or probable means of prevention, which, with proper *certificates*, must be delivered to the Society on or before the first Tuesday in February, 1813.

57. Cure of the Foot-Rot in Sheep. To the person who shall discover to the Society the best and most effectual method of

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curing the foot-rot in sheep; the silver medal.

It is required that the cure be ascertained by repeated and satisfactory experiments, and the method of performing it be verified by proper *certificates* delivered to the Society on or before the first Tuesday in February, 1813.

58. Preventing the ill Effects of Flies on Sheep. To the person who shall discover to the Society the most effectual method of protecting sheep from being disturbed and injured by flies; the silver medal.

It is required that the method be ascertained by repeated experiments, and that a *certificate* of its efficacy be delivered to the Society on or before the first Tuesday in December, 1812.

59. Protecting Sheep. To the person who, in the year 1811, shall protect the greatest number of sheep, not fewer than one hundred, by hovels, sheds, or any other means, and give the most satisfactory account, verified by experiment, of the advantages arising from the practice of protecting sheep from the inclemency of the weather, by hovels, sheds, or any other means; the gold medal.

A particular *account* of the experiments made, with the advantages arising therefrom, together with the expense, and *certificates* of its utility, to be produced to the Society on or before the first Tuesday in March, 1813.

N. B. It is required that the *certificates* shall specify the length of time the sheep were so protected, and the manner in which they were maintained during that time; together with the general method of managing them.

60. Culture of Hemp. The Society wishing to encourage the growth of hemp for the use of the navy in every part of the united Empire, offer to the person who shall sow with hemp, in drills at least eighteen inches asunder, the greatest quantity of land in any part of the united Empire, not less than fifty acres statute measure, in the year 1812, and shall at the proper season cause to be plucked the summer hemp, (or male hemp bearing no seed) and continue the winter hemp (or female hemp bearing seed) on the ground until the seed is ripe; the gold medal.

61. To the person who shall sow with hemp, in drills at least eighteen inches asunder, the next greatest quantity of land in any part of the united Empire, not less than twenty-five acres, statute measure, in the year 1812, and shall at the proper season cause the same to be plucked as abovementioned; the silver medal.

Certificates of the number of acres, of the distance of the drills, of the plucking of the hemp, with a general *account* of the soil, cultivation, and produce, to be delivered to the Society, along with fourteen pounds of hemp and two quarts of the seed, on or before the second Tuesday in January, 1813.

62. Feeding of Cattle. For the best experiments on stall feeding of cattle (not less than five head) to be continued for the space of twelve months, in order to prove the earliest maturity and greatest propensity to fatten, of the most approved breeds of cattle in Great Britain, specifying the nature of the food given, together with the daily consumption of each beast, with its weekly increase in weight, and such other observations as may be deemed of consequence; the gold medal.

A full *account* of the methods employed, and of the expenses attending the same, and *certificates* of the sundry matters stated, to be produced on or before the second Tuesday in January, 1813.

PREMIUMS FOR DISCOVERIES AND IMPROVEMENTS IN CHEMISTRY, DYEING, AND MINERALOGY.

63. Preserving Seeds of Vegetables. For the best method of preserving the Seeds of plants in a state fit for vegetation a longer time than has hitherto been practised, such method being superior to any known to the public, and verified by sufficient trial, to be communicated to the Society on or before the first Tuesday in December, 1812; the gold medal, or thirty guineas.

64. Preventing the Dry-Rot in Timber. To the person who shall discover to the Society the cause of the dry-rot in timber, and disclose a certain method of prevention superior to any hitherto known; the gold medal, or thirty guineas.

The *accounts* of the cause, and method of prevention, confirmed by repeated experiments, to be produced to the Society on or before the second Tuesday in Dec. 1812.

65. Preserving salted Provisions from becoming rancid or rusty. To the person who shall discover to the Society the best, cheapest, and most efficacious method of preserving salted provisons from becoming rancid or rusty; the gold medal, or thirty guineas.

A full *description* of the method, with proper *certificates* that it has been found on repeated trials to answer the purpose intended, to be produced to the Society on or before the first Tuesday in February, 1813.

66. Refining Whale or Seal Oil. For disclosing to the Society an effectual method of purifying whale or seal oil from the glutinous matter that incrusts the wicks of lamps, and extinguishes the light though fully supplied with oil; the gold medal, or fifty guineas.

It is required that the whole of the process be fully and fairly disclosed, in order that satisfactory experiments may be made by the Society to determine the validity of

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the claim; and *certificates* that not less than twenty gallons have been purified according to the process delivered in, together with two gallons of the oil, in its unpurified state, and two gallons so refined, to be produced to the Society on or before the second Tuesday in February, 1813.

67. Manufacturing Tallow Candles. To the person who shall discover to the Society a method of hardening or otherwise preparing tallow, so that candles may be made of it which will burn as clear and with as small a wick as wax candles, without running, and may be afforded at a less expense than any at present made with spermaceti; the gold medal, or fifty guineas.

Certificates that 112lb. of such tallow have been made into candles, and 12lb. of the candles made thereof, to be produced to the Society on or before the Second Tuesday in January, 1813.

68. Candles from Resin or other Substances. To the person who shall discover to the Society the best method of making candles of resin, or any other substance, fit for common use, at a price much inferior to those made of tallow only; the gold medal, or thirty guineas.

Six pounds at least of the candles so prepared, with an *account* of the process, to be delivered to the Society on or before the first Tuesday in December, 1812.

69. Method of separating Sugar in a solid Form from Treacle. To the person who shall discover to the Society the best method of separating sugar from treacle, in a solid form, at such an expense as will render it advantageous to the public; the gold medal, or fifty guineas.

A quantity of the sugar so prepared, in a solid form, not less than thirty pounds weight, with an *account* of the process, and *certificates* that not less than one hundred weight has been so prepared, to be produced to the Society on or before the first Tuesday in February, 1813.

70. Increasing Steam. To the person who shall invent and discover to the Society a method, verified by actual experiments, of increasing the quantity or force of steam, in steam-engines with less fuel than has hitherto been employed, provided that in general the whole amount of the expences in using steam-engines may be considerably lessened; the gold medal, or thirty guineas.

To be communicated to the Society on or before the first Tuesday in January, 1813.

71. Substitute for Tar. To the person who shall invent and discover to the Society the best substitute for Stockholm tar, equal in all its properties to the best of that kind; and prepared from materials the produce of the united Kingdom and its Colonies; the gold medal, or one hundred guineas. A quantity of the substitute, not less than one hundred weight, with *certificates* that at least one ton has been manufactured, and that it can be afforded at a price not exceeding that of the best foreign tar, together with an *account* of the process, to be delivered to the Society on or before the first Tuesday in March, 1813.

72. Turpentine from the Scotch Fir or Pinus Sylvestris. For the greatest quantity of turpentine, not less than two hundred weight prepared in Great Britain from that species of fir called the Scotch fir, or Pinus sylvestris, Linn.; the gold medal.

Certificates of the turpentine being prepared from such trees of British growth, together with fifty-six pounds of the turpentine, to be delivered to the Society on or before the second Tuesday in January, 1813.

73. For the next greatest quantity prepared, not less than one hundred weight, on similar conditions; the silver medal.

N. B. The Society being in possession of the method practiced for extracting turpentine from the trees whilst growing, and of samples so procured, information will be given upon the subject, on application for that purpose, at the Society's house.

74. Preparation of Tan. To the person who shall prepare, in the most concentrated form, so as to be easily portable, and at a price applicable to the purposes of manufacturers, the largest quantity, not less than one hundred weight of the principle called by the French *tannin*, which abounds in oak-bark and many other vegetable substances; the gold medal, or thirty guineas.

Certificates of the superior quality of the quantity so prepared, and a sample of not less than 28lb. to be produced to the Society on or before the last Tuesday in January, 1813.

75. Indelible Ink. To the person who shall discover to the Society a method of making a black ink proper for writing, superior to any at present known, indestructible by chemical applications, and not dearer than that which is now in common use; the silver medal, or fifteen guineas.

Certificates that not less than two gallons of such ink have been actually prepared, and found to possess the qualities above-mentioned, with a full detail of the process of making it, and two quarts of the ink to be delivered to the Society on or before the second Tuesday in January, 1813.

76. Preparation of a Red Stain for Cotton Cloth. To the person who shall communicate to the Society the cheapest and most effectual method of printing or staining cotton cloths with a red colour, by an immediate application of the colouring matter to the cloth, equally beautiful and durable with the red colours now generally procured from decoctions of madder; the gold medal, or fifty guineas.

Certificates that the above process has been advantageously used on ten pieces of calico, each twenty-one yards or upwards in length; one piece of the calico so printed,

a quart of the colour in a liquid state, and a full *account* of the preparation and application to be produced to the Society on or before the second Tuesday in January, 1813.

77. Preparation of a green Colour for printing cotton Cloth. To the person who shall communicate to the Society the best and cheapest method of printing with a full green colour on cotton cloth, by an immediate application of the colouring matter from a wooden block to the cloth, equally beautiful and durable as the colours now formed from the complicated process of the decoction of weld on alumine, and the solutions of indigo by earths or alkaline salts; the gold medal, or fifty guineas.

Certificates and conditions as for Premium 76.

78. Rendering Muslin less Combustible. To the person who shall discover to the Society a method of rendering muslin less combustible, to be effected by a cheaper and more effectual mode than any hitherto known; the silver medal.

Specimens of the muslin so prepared, with a full account of the process employed for the purpose, to be produced to the Society on or before the first Tuesday in February, 1813.

N. B. It is expected that the means employed shall neither injure the quality of the muslin, stain it, nor damage any print or dye with which it may be coloured.

79. White Substance for the Basis of Paint. To the person who shall produce to the Society the best white substitute, superior to any hitherto known, for the basis of paint, equally proper for the purpose as the white-lead now employed; such substitute not to be of a noxious quality, and to be afforded at a price not materially higher than that of white-lead, the gold medal, or one hundred guineas.

A quantity of the substitute, not less than 50lb. weight, with an *account* of the process used in preparing it, and *certificates* that at least one hundred weight has been manufactured, to be produced to the Society on or before the first Tuesday in January, 1813.

80. Red Pigment. To the person who shall discover to the Society a full and satisfactory process for preparing a red pigment, fit for use in oil or water, equal in tone and brilliancy to the best carmines and lakes now known or in use, and perfectly durable; the gold medal, or fifty guineas.

One pound weight of such colour, and a full disclosure of its preparation, to be produced to the Society on or before the first Tuesday in February, 1813.

N. B. It is not required that the colour should resist the action of fire, or chemical applications, but remain unaltered by the common exposure to strong light, damps, and noxious vapours.

81. Ultramarine. To the person who shall prepare an artificial ultramarine, equal in colour, brilliancy, and durability, to the best prepared from lapis lazuli, and which may be afforded at a cheap rate; the gold medal, or thirty guineas.

The conditions are the same as in the preceding Premium for the red pigment.

82. Blue Pigment from Iron. To the person who shall invent, and discover to the Society, the best blue pigment from iron, superior to Antwerp or Prussian blue in colour and durability, fit for use in oil or water, which may be afforded at a cheap rate; the gold medal, or thirty guineas.

One pound weight of the colour, and a full disclosure of its preparation, to be produced to the Society on or before the first Tuesday in February, 1813.

N. B. It appears from the analysis of lapis lazuli by Klaproth, and the experiments of Guyton, (related in the Annales de Chemie) that ultramarine is a blue sulphurat of iron, and that a blue substance much resembling it is constantly found amongst the scoriæ of blast furnaces where iron is reduced. The Society by offering the above premium wish to call the attention of persons to these facts, and encourage them to make experiments, in the hope of producing a blue pigment which may be substituted for ultramarine.

83. Destructive Effects from Moths. To the person who shall discover to the Society a cheap, easy, and effectual method, verified by repeated and satisfactory trials, of preventing the destructive effects occasioned by moths and other insects, in furs, woollens, and other articles, superior to any hitherto known or practised; the silver medal, or fifteen guineas.

The *accounts*, with proper *certificates*, to be produced to the Society on or before the first Tuesday in January, 1813.

84. Statuary Marble. To the person who shall discover, within Great Britain or Ireland, a quarry of white marble fit for the purposes of statuary, and equal in all respects to those kinds now imported from Italy; the gold medal, or one hundred guineas.

A block of at least three feet in length, two in height, and two in width, with an account of the situation of the quarry, and *certificates* of its possessing considerable extent, to be produced to the Society on or before the first Tuesday in February, 1813.

N. B. In order to prevent useless expense or trouble to the claimant in forwarding so large a block, the Society will be ready to examine any smaller specimen of the marble, and express their opinion of its value to the candidate before the block required by the above premium is produced.

85. Preparation of Sulphuric Acid, from Sulphur without the Use of any Nitric Salt. To the person who shall prepare the largest quantity (not less than one ton) of sulphuric acid from sulphur without any nitric salt, of a specific gravity not in-

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ferior to the best sulphuric acid of commerce; the gold medal, or fifty guineas.

Certificates that not less than the above quantity of such an acid has been prepared, together with a sample, to be produced to the Society on or before the first Tuesday in January, 1813.

86. Preparation of any Alkaline or Earthen Nitrate. To the person who shall prepare, in Great Britain, the largest quantity, not less than one hundred weight, of any salt of nitric acid, with either earths or alkalis, by a method superior to, and as cheap as those hitherto practised; the gold medal, or one hundred guineas.

Certificates of the above quantity having been prepared, and a sample of not less than 28lb. to be produced to the Society on or before the last Tuesday in January, 1813.

87. Fine Bar Iron. To the person, in Great Britain, who shall make the greatest quantity of bar-iron, not less than ten tons with coak, from coak pigs, equal in quality to the best iron imported from Sweden or Russia, and as fit for being converted into steel; the gold medal, or fifty guineas.

Samples, not less than one hundred weight, with *certificates* that the whole quantity is of equal quality, to be produced to the Society on or before the first Tuesday in January, 1813.

88. Preserving Iron from Rust. To the person who shall invent and discover to the Society a cheap composition, superior to any now in use, which shall effectually preserve wrought iron from rust; the gold medal, or fifty guineas.

A full description of the method of preparing the composition, with *certificates* that it has stood at least two years unimpaired, being exposed to the atmosphere during the whole time, to be produced to the Society, with ten pounds weight of the composition, on or before the first Tuesday in January, 1813.

89. Refining Block Tin. To the person who shall discover to the Society the best method of purifying or refining block-tin, so as to render it fit for the finest purposes to which grain-tin is now applied, and not higher in price; the gold medal, or fifty guineas.

Certificates that not less than three tons have been so refined or purified, with a full detail of the process, and a quantity, not less than one hundred weight, of the tin so refined, to be produced to the Society on or before the first Tuesday in January, 1813.

90. Glazing Earthen-Ware without Lead. To the person who shall discover to the Society the cheapest, safest, most durable, and most easily fusible composition, fit for the purpose of glazing the ordinary kinds of earthen-ware, without any preparation of lead, and superior to any hitherto in use; the gold medal, or thirty guineas.

Specimens of the ware so glazed, with proper *certificates* of its having succeeded, and a sample of the materials made use of, to be produced to the Society on or before the first Tuesday in February, 1813.

91. Cobalt, Zaffre, and Smalt. For the discovery of a mine of cobalt in Great Britain or Ireland, that will produce a sufficient quantity of the mineral, of good quality, to supply a manufacture of Zaffre or Smalt; the gold medal, or thirty guineas.

Certificates that at least one ton of the ore has been raised; and five pounds of Zaffre, and ten pounds of Smalt made therefrom, to be produced to the Society on or before the last Tuesday in March, 1813.

N. B. It appears from the minutes of the Society, in 1755, that a discovery of cobalt was made at or near Truro in Cornwall, but not a sufficient quantity of ore found to answer the desired purpose.

92. Refining Copper from the Ore. To the person who shall discover to the Society the best method of separating, purifying, and refining copper from the ore, so as to render it fit for the finest purposes to which fine copper is now applied, and by a process superior to any hitherto known or in use, and not higher in price; the gold medal, or fifty guineas.

Certificates that not less than three tons have been so prepared or refined, and a quantity not less than one hundred weight of the copper so refined to be produced to the Society on or before the first Tuesday in February, 1813.

93. Mineralogical Map of England and Wales. To the person who shall complete and publish an accurate mineralogical map of England and Wales, on a scale of not less than ten miles to an inch, containing an account of the situation of the different mines therein, and describing the kinds of minerals thence produced; the gold medal, or fifty guineas.

Certificates of the accuracy of such map, together with the map, to be produced to the Society on or before the first Tuesday in February, 1813. The map to remain the property of the Society.

94. Mineralogical Map of Ireland. The same premium is offered for a mineralogical map of Ireland, on similar conditions.

95. Mineralogical Map of Scotland. The same premium is offered for a mineralogical map of Scotland, on similar conditions.

96. Natural History. To the author who shall publish, in the year 1812, the natural history of any county in the united kingdom; the gold medal, or fifty guineas.

It is required that the several natural productions, animal, vegetable, and mineral, peculiar to the county, or found therein, be carefully and scientifically arranged and described, in order that the public may be enabled to judge what arts or manufactures are most likely to succeed in such county. The work to be delivered to the Society on or before the last Tuesday in January, 1813, and a copy to be the property of the Society.

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PREMIUMS IN POLITE ARTS.

97. Honorary Premiums for Drawings by Nobility. For the best original drawing of any kind, by young gentlemen under the age of twenty-one, sons or grandsons of peers or peeresses in their own right, of Great Britain or Ireland; the honorary medal of the Society in gold.

98. The silver medal for the best copy.

99—100. The same premiums will be given, on the like conditions, to young ladies, daughters or grand-daughters of peers or peeresses in their own right, of Great Britain or Ireland.

101. Honorary Premiums for Drawings by Gentlemen. For the best original drawing of any kind, by young gentlemen under the age of twenty-one; the gold medal.

102. For the best copy, the silver medal.

103—104. The same premiums will be given for drawings by young ladies.

N. B. As the foregoing honorary premiums are intended only for such of the nobility and gentry as may hereafter become patrons or patronesses of the arts; persons professing any branch of the polite arts, or any business dependant on the arts of design, or the sons or daughters of such persons, will not be admitted candidates in the above classes, including 97 to 104.

105. Drawings of Outlines. For the best outline, after the plaister cast of the Gladiator Repellens, by persons of either sex under the age of twenty-one, the figure not less than eighteen inches; the silver medal.

106. Drawings of Landscapes. For the best drawing, in water-colours, of a landscape after nature, not less than eighteen inches by twelve, by persons of either sex, under twenty-one years of age; the silver medal.

107. Historical Drawings. For the best historical drawing, being an original composition of three or more human figures, the height of the principal figure not less than eight inches, by persons of either sex under twenty-one years of age; the gold medal.

108. For the next in merit: the silver medal.

109. Premiums for Drawings in General. For the best original drawing of any kind, by persons of either sex, under the age of twenty-one; the gold medal.

110. For the best copy, the silver medal.

111. Perspective Drawings of Machines. For the best perspective drawings of machines, by persons under twenty-one years of age; the silver medal.

112. Paintings in Oil. For the best painting in oil, of a landscape after nature, the size not less than thirty-six by twenty-eight inches; by persons of either sex, under twenty-five years of age; the gold medal.

113. For the next in merit, the silver medal. Each candidate must mention from whence the view was taken.

114. Marine Painting. For the best original painting in oil of a marine subject, the size not less than thirty-six by twenty-eight inches, by persons of either sex, under twenty-five years of age, the lesser gold medal.

115. For the next in merit, the lesser silver medal, on similar conditions.

116. Architectural Designs. For the best original design of a palace, consisting of plan, elevation, and section, the gold medallion; the drawings to remain the property of the Society.

117. For the next in merit; the silver medallion on similar conditions.

The following inscription to be engraved on these medallions; *The Premium given by the Society for the Encouragement of Arts, Manufactures, and Commerce, in conformity to the Will of John Stock, Esq. of Hampstead.*

118. Plaster Cast. For the best original model of a single figure, or group not exceeding three figures; the lesser gold medal.

119. For the next in merit; the lesser silver medal, on similar conditions.

N. B. Purity and simplicity are required to be attended to in the general form, as well as correctness in the several parts of the figure.

A cast from the model to remain the property of the Society.

120. Bronzes. For the best drapery figure or group cast in bronze; if a single figure, not less than twelve inches high, and if a group, not less than nine inches; and which will require the leas tadditional labour to repair; the gold medal, or the silver medal and twenty guineas.

The Society, sensible of the great importance of correct Drawing and free Etching, as the best and most solid ground work for the rising school of engraving, offer the following premiums for the pupils of engravers, or others who practice that art.

121. Drawings by Engravers' Pupils, &c. For the best finished drawing of the statue of the Discobolos, No. 34, in the British Museum; the size of the drawing not less than eighteen inches, by persons under twenty-one years of age; the silver medal.

122. Drawings of the Hand and Foot. For the best drawing with a reed, or common pen, of the human hand and foot, the size of life, or larger; the several parts marked with anatomical accuracy; the lesser silver medal.

123. Pen Drawing of a Head. For the best free pen drawing of the head of Homer, marked No. 33, in the British Museum, not less than twelve inches in heighth; the lesser silver medal.

N. B. Those artists who are inclined to make trial for the premiums in drawing of the Discobolos, or the head of Homer, (with permission of the trustees) at the British Museum, in the room marked X, may be informed by the Secretary, of the proper mode of applying for that permission.

124. Etching of an Historical Subject. For the best free etching in historical composition from a picture of eminence; the gold medal.

125. For the next in merit; the silver medal.

126. Etching of a Landscape. For the best free etching in landscape composition, from a picture of eminence; the silver medal.

127. Etching of a Portrait. For the best free etching of a portrait; the silver medal.

128. Historical Engraving. For the best finished engraving in historical composition, wherein the chiaro scuro is required to be particularly attended to; the gold medal.

129. For the next in merit; the silver medal.

130. Landscape Engraving. For the best finished engraving in landscape composition, wherein the same attention to chiaro scuro will be required; the gold medal.

131.—For the next in merit; the silver medal.

132. Engraving of a Portrait. For the best finished engraving of a portrait, with equal attention to chairo scuro; the gold medal.

133. For the next in merit; the silver medal.

N. B. In the class of finished engravings the Society require a forward aquafortis impression, and two in progressive states of the plate; and a finished proof to be sent, and to remain with the Society.

134. Engraving on Wood Blocks. For the best engraving on wood blocks of an historical subject; the size of the principal figure not less than six inches in height, and the block to be at least twelve inches by nine; the gold medal.

Two or more impressions, with the block, to be produced to the Society. The impressions, but not the block, to remain the property of the Society.

135. For the next in merit; the silver medal, on similar conditions.

136. Medal Die Engraving. For the best die engraving of one or more heads after the engraver's own model; the gold medal.

137. For the next in merit; the silver medal.

138. For the best die engraving of one figure, or a group consisting of not more than three figures, after the engraver's own model; the gold medal.

139. For the next in merit; the silver medal.

The dies, with two impressions or casts, and the model, in each claim for medal die sinking are to be produced to the Society. The impressions or casts, but not the model or die, to remain the property of the Society.

140. Black Lead Pencils. The silver medal, or twenty guineas, is offered to the person who shall discover an effectual method of freeing black-lead from impurity, and improving its quality, for the purposes of the arts.

N. B. The object of this premium is to obtain hard or soft pencils, uniformly of a good quality.

CONDITIONS.

FOR THE POLITE ARTS.

No articles in the class of polite arts, whether for claims or bounties, are to be admitted into the Society after the first Tuesday in March, 1813.

No person who has gained the first premium in any class shall be admitted a candidate in a class of inferior age; and no candidate shall receive more than one premium in one year.

No person shall be admitted a candidate in any class, who has already obtained the first premium in that class.

No more than one performance in any class shall be received from the same candidate.

All performances (to which premiums or bounties are adjudged) shall remain with the Society until after the first Wednesday in June, 1813, when they will be re-delivered, unless mentioned in the premiums to the contrary.

No performance shall be admitted, that has obtained a reward from any other society, or academy, or been offered for that purpose.

It is required, that the matters for which premiums are offered, be delivered in without the names, or any intimation to whom they belong appearing; that each particular thing be marked in what manner each claimant thinks fit, such claimant sending with it a paper sealed up, having on the outside a corresponding mark, and on the inside the claimant's name, residence, and age; which paper is not to be opened unless the candidate be successful, or by a special vote of the Society.

To encourage real merit; and prevent attempts to impose on the Society, by producing drawings made or retouched by any other person than the candidate, the Society require a specimen of the abilities of each successful candidate, to be made under the inspection of the Committee of Polite Arts.

All candidates in the Polite Arts are required to signify, on their drawings, whether the performances are originals or copies; and to mark thereon the class for which each is intended, and if possible to send the originals from which copies are taken.

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PREMIUMS FOR ENCOURAGING AND IMPROVING MANUFACTURES.

141. Employment of Females. To the person who shall instruct and employ the greatest number of females, not fewer than twenty, in the making of mens' cloaths, particularly of woollen cloth, and not being for the use of the army or navy; the gold medal, or fifty guineas.

Certificates that the number of women above-mentioned, have been constantly so employed for at least three months, to be produced to the Society, on or before the last Tuesday in March, 1813.

142. For the next greatest number of women so employed, not fewer than ten; the silver medal, or fifteen guineas, on similar conditions.

143. Cloth from Hop-Stalks, Nettles, &c. To the person who shall produce to the Society the greatest quantity, not less than thirty yards of cloth, at least 27 inches wide, made in Great Britain or Ireland, of hop-stalks or bines, nettles, or other raw vegetable substances, the produce of Great Britain or Ireland, superior to any hitherto manufactured from such substances, and which can be generally afforded as cheap as cloth of equal quality and appearance now made from hemp, flax, or cotton, and much finer in quality than any hitherto manufactured in England from hop-stalks, &c.; the gold medal, or thirty guineas.

One pound of the thread of which the cloth is made, and thirty yards of the cloth, together with proper *certificates* that the whole is manufactured from hop-stalks or bines, &c. to be produced to the Society on or before the first Tuesday in December, 1812.

N. B. The Society is already in the possession of cloth made in England from hop-stalks or bines, and nettles, which may be inspected by application to the Housekeeper.

144. Sheep's Wool. To the person who shall prove to the Society that he has sold the largest quantity of Merino wool, or such wool as will answer the same purposes, being the produce of his own flock, in the United Kingdom, for the purpose of being manufactured in superfine cloth, the quantity of wool not less than five hundred weight, in the year 1812; the gold medal.

Certificates, along with samples of the wool, and of cloth manufactured from it, to be produced to the Society on or before the last Tuesday in March, 1813.

145. For the next greatest quantity, not less than two hundred and fifty pounds; the silver medal on similar conditions.

146. Hog's Bristles. To the person who shall prepare the greatest quantity of bristles, from swine bred in the united kingdoms, equal in quality to those imported from Russia or Prussia, and at as cheap a rate; the silver medal, or fifteen guineas.

Certificates, that not less than one hundred weight have been so prepared, and a sample of not less than fourteen pounds of such bristles, to be produced to the Society on or before the last Tuesday in February, 1813.

147. Wicks for Candles or Lamps. To the person who shall discover to the Society a method of manufacturing hop-stalks or bines, nettles, or any other cheap material, the growth of Great Britain, so as to render them equally fit for the purpose of supplying the place of cotton, for wicks of candles or lamps; the silver medal, or twenty guineas.

Samples, not less than five pounds weight, of the wick so prepared, to be produced to the Society on or before the last Tuesday in December, 1812, with *certificates* that the whole quantity is equal in quality to the sample.

148. Experiments to ascertain the proper Th[illegible] of Wicks for Candles. To th[illegible] who shall make known to the [illegible]st satisfactory result of a series [illegible]ments, actually made by him to deter[illegible]ne the best thickness of cotton wicks for candles, so as to obviate the defects of those commonly used; the silver medal, or ten guineas.

Certificates, that not less than one hundred weight have been so made, and six pounds of the candles, to be produced to the Society on or before the last Tuesday in February, 1813.

N. B. The intention in offering this premium, is to ascertain the proper thickness or bulk of the wick in proportion to that of the tallow, and to remove the unpleasant consequences and waste arising from the sparkling, or guttering of the candles in common use.

149. Paper from raw Vegetable Substances. To the person who shall, between the first of January, 1812, and the first of January, 1813, make the greatest quantity, and of the best quality, (not less than ten reams) of good and useful paper, from raw vegetable substances, the produce of Great Britain or Ireland, of which one hundred weight has not been used in manufacturing paper, previous to January, 1811, superior to any hitherto manufactured from such substances, and which can be generally afforded as cheap as paper of equal quality and appearance now made from rags; the silver medal, or twenty guineas.

N. B. The object of the Society being to add to the number and quantity of raw materials used in this manufacture, it is their wish to include every useful sort of paper, and to introduce such natural products as can be easily and cheaply procured in great quantities. The Society are in possession of two volumes containing a great variety of specimens of paper made from raw vegeta-

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ble substances, viz. nettles, potatoe-haulm, poplar, hop-bines, &c. which volumes may be inspected by any person on application to the Housekeeper.

Certificates of the making such paper, and one ream of the paper, to be produced on or before the second Tuesday in January, 1813.

150. Transparent Paper. To the person who shall discover to the Society a method of making paper from the pulp, that shall be perfectly transparent, and of a substance and body equal to foolscap, that shall take and bear common writing-ink, with the same facility and correctness as writing-paper generally in use; the silver medal, or twenty guineas.

Certificates of the making such paper, an *account* of the process, and one ream of the paper, to be produced on or before the second Tuesday in January, 1813.

151. Chintz Patterns for Calico-Printers. For the best original pattern in a new taste, of light and dark-ground chintz for garment-work, or furniture, fit for the purposes of calico-printers, by persons of either sex; the silver medal. The pattern for which the premium is adjudged to remain the property of the Society.

152. Copper-plate Patterns for Calico-Printers. For the best pattern, in a new style, fit for the purposes of calico-printers for garment-work, or furniture; the silver medal. The pattern for which premium is adjudged to remain the property of the Society.

N. B. The patterns to be produced on or before the last Tuesday in February, 1813.

153. Gloves equal to French Kid. To the person who shall make known to the Society, a process equal to that of the French, or a superior one; for preparing, dyeing, and finishing the skins, verified by actual experiments, and the communication accompanied with at least a dozen pair of gloves made from skins so prepared in an equal or superior manner; the gold medal, or forty guineas.

Certificates from competent persons fully approving of the result of such experiments, together with the gloves and communication to be produced to the Society on or before the last Tuesday in March, 1813.

154. Improved Cat-Gut equal to Roman or Italian. To the person who shall discover to the Society, the best method of manufacturing, in the United Kingdom of Great Britain and Ireland, the intestines of sheep, lambs, goats, or of any other animals, into the article called cat-gut, equally strong, clear, smooth, even, and free from knots, as the best Roman and Italian strings, and at a price not exceeding what they are usually sold for in England; the gold medal, or thirty guineas.

Certificates that not less than fifty pounds weight have been so prepared by the claimant, with a full detail of the process, and samples of the article of various thicknesses, to be produced to the Society on or before the first Tuesday in February, 1813.

PREMIUMS IN MECHANICS.

155. Gunpowder Mills. To the person who, in the year 1812, shall invent and bring to perfection the most effectual method of so conducting the works of gunpowder-mills, in the business of making gunpowder, as to prevent explosion; the gold medal, or one hundred-guineas.

Certificates and *accounts* of the method having been put in practice in one or more gunpowder-mills in this kingdom, and that it promises, in the opinion of the best judges concerned in such works, to answer the purpose intended, to be produced to the Society on or before the first Tuesday in February, 1813.

N. B. As an encouragement to persons to turn their thoughts to improvements of this nature, if any should be made on the present method of conducting the business of gunpowder making, which fall short of the total prevention of explosion, and they are sent to the Society for the sake of humanity, the papers so sent in will receive due consideration, and such bounty or reward will be bestowed as they may appear to merit.

156. Transit Instrument. To the person who shall invent and produce to the Society a cheap and portable transit instrument which may easily be converted into a zenith-sector, capable of being accurately and expeditiously adjusted for the purpose of finding the latitudes and longitudes of places, and superior to any portable transit-instrument now in use; the gold medal, or forty guineas.

To be produced on or before the last Tuesday in January, 1813.

157 Taking Whales by the Gun-Harpoon. To the person who, in the year 1812, shall strike the greatest number of whales, not fewer than three, with the gun-harpoon; ten guineas.

Certificates of the striking such whales, and that they were actually taken in the year 1812, signed by the master, or by the mate when the claim is made by the master, to be produced to the Society, on or before the last Tuesday in December, 1812.

158. *This premium is extended one year further, on similar conditions.*

159. Family Mill. To the person who shall invent and produce to the Society the best-constructed mill for grinding corn for the use of private families, or parish-poor; the construction to be such as to render the working of the mill easy and expeditious, and superior to any hitherto in use; the gold medal, or thirty guineas.

The mill, and *certificates* of its having been used to good effect, to be produced to the Society on or before the first Tuesday

in February, 1813. Cheapness and simplicity will be considered as essential parts of its merit; and the mill or a model, to remain with the Society.

160. Machine for raising Coals, Ore, &c. &c. To the person who shall invent a machine for raising coals, ore, &c. from mines, superior to any hitherto known or in use; and which shall produce the effect at a less expense than those already known or in use; the gold medal, or fifty guineas.

A model of the machine, made on a scale of not less than one inch to a foot, with a *certificate* that a machine at large on the same construction has been advantageously used, to be produced to the Society on or before the second Tuesday in February, 1813.

161. Improved Walking-Wheel, or Crane. To the person who shall invent an improved walking-wheel or crane, on which the weight and power of any person or persons shall be applied with the greatest safety and effect, and so contrived that the power can be varied according to the greater or less weight to be raised or lowered; the gold medal, or thirty guineas.

The model on a scale of not less than one inch to a foot, with a proper *certificate* that the machine at large has been employed to good effect, to be produced to the Society on or before the second Tuesday in February, 1813.

162. Machine for raising Water. To the person who shall invent a machine on a better, cheaper, and more simple construction than any hitherto known or in use for raising water out of wells, &c. from a depth of not less than fifty feet; the gold medal, or thirty guineas.

Certificates of the performance of the machine and a model of it, on a scale of not less than one inch to a foot, to be produced to the Society on or before the first Tuesday in February, 1813.

163. Elm Pipes. To the person who shall invent and discover to the Society a substitute for the elm pipes now in common use for the conveyance of water, which shall be cheaper, equally effectual, and more durable than any heretofore employed; the gold medal, or fifty guineas.

It is required that one of the pipes so employed, an accurate *account* of the method used, and every expense attending it, together with satisfactory accounts of its being effectual, to be delivered to the Society on or before the second Tuesday in January, 1813.

164. Laying Wooden Pipes. To the person who shall invent and discover to the Society a superior method of laying or connecting the wooden pipes now in use for conveying water, so as to lessen the injury they receive thereby; the silver medal, or twenty guineas.

It is required that a model, an accurate *account* of the method used, and every expense attending it, together with satisfactory *certificates* of its being effectual, be delivered to the Society on or before the second Tuesday in January, 1813.

165. Extinguishing Fires. To the person who shall produce to the Society the best and most effectual method of procuring an immediate supply of water in case of fire, or for the means best calculated to prevent or extinguish accidental fires in buildings, superior to any now in use; the gold medal, or thirty guineas.

Certificates of the method having been practised with success, with a full description thereof, to be delivered to the Society on or before the second Tuesday in January, 1813.

166. Boring and Blasting Rocks. To the person who shall discover to the Society a more simple, safe, cheap, and expeditious method than any hitherto known or in use, of boring or blasting rocks in mines, shafts, wells, &c.; the gold medal, or thirty guineas.

Certificates of the method having been practised with success, with a full description thereof, to be delivered to the Society on or before the first Tuesday in January, 1813.

167. Heating Rooms for the Purpose of Manufacturers. To the person who shall invent and discover to the Society a method of heating rooms, superior to any hitherto known or in use, and at a moderate expense, for the purpose of painters, japanners, and other manufacturers, so as to avoid the necessity of iron or copper tunnels going through the rooms to convey the smoke, whereby the danger from such tunnels may be prevented; the gold medal, or forty guineas.

A model or complete drawing and description of the method, with *certificates* that it has been successfully practised, to be delivered to the Society on or before the last Tuesday in March, 1813.

168. Improved Ventilation. To the person who shall invent and produce to the Society a mode of permanently ventilating the apartments in hospitals, workhouses, and other crowded places, superior to any now known or used; the gold medal, or fifty guineas.

A model of the apparatus, and a full *account* of the means by which the effect has been produced, with proper *certificates*, to be delivered to the Society on or before the last Tuesday in February, 1813.

169. Preventing Accidents from Horses falling with two-wheeled Carriages. To the person who shall invent and produce to the Society a method, superior to any hitherto known or in use, to prevent accidents from the falling of horses with two-wheeled carriages, especially on steep declivities; the silver medal, or fifteen guineas.

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A model of the apparatus, and a full *account* of the means by which the effect has been produced, with proper *certificates* that the same has been used with success, to be delivered to the Society on or before the second Tuesday in January, 1813.

170. Improving Turnpike and other Roads. To the person who shall discover to the Society the most effectual and cheapest method, verified by actual experiments, of combining the materials ordinarily employed in making or repairing roads, so as to form them of the hardest consistency by their cementing properties, or by an artificial mixture of earth, stones, &c. altered by heat, or any other mode, so as to form an even, hard, and durable carriage-road; the gold medal, or thirty guineas.

It is required that an accurate *account* of the method used, and every expense attending it, together with satisfactory *certificates* of its being effectual, be delivered to the Society on or before the first Tuesday in March, 1813.

171. Raising the Bodies of Persons who have sunk under Water. To the person who shall invent and produce to the Society a cheap and portable drag, or other machine, superior to those now in use, for the purpose of taking up, in the best and most expeditious manner, and with the least injury, the bodies of persons who have sunk under water; the gold medal, or thirty guineas.

The drag or machine, to answer the purpose intended, to be produced to the Society on or before the first Tuesday in March, 1813.

172. For preventing prejudicial Effects to the Persons employed in Pointing Needles. To the person who shall invent and produce to the Society a mode of obviating the prejudicial effects that attend the operation of pointing needles, by grinding them dry, during which the particles of grindstone-dust, and steel, being thrown into the air, and received with it into the lungs, occasion asthma, consumption, and other painful disorders; the gold medal, or thirty guineas.

A model of the apparatus, and a full *account* of the means by which the effect has been produced, together with proper *certificates* of its practicability and adoption, to be delivered to the Society on or before the second Tuesday in March, 1813.

PREMIUMS OFFERED FOR THE ADVANTAGE OF THE COMMERCE OF THE UNITED EMPIRE.

173. Taking Porpoises. To the people in any boat or vessel, who, in the year 1812, shall take the greatest number of porpoises on the coast of Great Britain or Ireland, by gun-harpoon, or any other method, not fewer than thirty, for the purpose of extracting oil from them; the gold medal, or thirty pounds.

Certificates of the number, signed by the persons to whom they have been sold or delivered for the purpose of extracting the oil, to be produced to the Society on or before the last Tuesday in January, 1813.

174. Oil from Porpoises. To the person who shall manufacture the greatest quantity of oil from porpoises taken on the coast of Great Britain or Ireland, in the year 1811, not less than twenty tons; the gold medal, or thirty pounds.

Certificates of the oil having been made from porpoises actually caught on the coast of Great Britain or Ireland, and two gallons of the oil as a sample, to be produced to the Society on or before the last Tuesday in February, 1813.

175. Curing Herrings. To the person or persons who shall, before January, 1813, cure the greatest quantity of white herrings, not less than thirty barrels, equal in all respects to the best Dutch herrings, the same being caught in the British or Irish seas, and cured in a British or Irish vessel or port; the gold medal, or fifty guineas.

176. For the next greatest quantity, not less than fifteen barrels; the silver medal, or twenty guineas.

A sixteen gallon barrel of the herrings to be produced to the Society on or before the first Tuesday in February, 1813, with *certificates*, that the conditions of the premium have been fulfilled, and that the whole were cured in the same manner as the specimen, together with a full description of the process employed.

PREMIUMS OFFERED FOR THE ADVANTAGE OF THE BRITISH COLONIES.

177. Nutmegs. For the greatest quantity of merchantable nutmegs, not less than ten pounds weight, being the growth of his Majesty's dominions in the West Indies, or any of the British settlements on the coast of Africa, or the several islands adjacent thereto, and equal to those imported from the islands of the East Indies; the gold medal, or fifty guineas.

Satisfactory *certificates*, from the governor or commander in chief, of the place of growth, with an *account* of the number of trees, their age, nearly the quantity of fruit, on each tree, and the manner of culture, to be produced on or before the first Tuesday in January, 1813.

178. Kali for Barilla. To the person who shall have cultivated, in the Bahama-islands, or any other part of his Majesty's dominions in the West Indies, or any of the British settlements on the coast of Africa, or

the several islands adjacent thereto, in the year 1811, the greatest quantity of land, not less than two acres, with Spanish kali fit for the purpose of making barilla; the gold medal, or thirty guineas.

179. For the next greatest quantity, not less than one acre; the silver medal, or fifteen guineas.

Certificates, signed by the governor or commander in chief for the time being, of the quantity of land so cultivated, and of the state of the plants at the time of signing such *certificates*, to be delivered to the Society, with samples of the kali, on or before the second Tuesday in January, 1813.

180. Destroying the Insect commonly called the Borer. To the person who shall discover to the Society an effectual method of destroying the insect commonly called the borer, which has of late years been so destructive to the sugar canes in the West-India islands, the British settlements on the coast of Africa, and the several islands adjacent thereto; the gold medal, or fifty guineas.

The discovery to be ascertained by satisfactory *certificates*, under the hand and seal of the governor or commander in chief for the time being, and of some other respectable persons, inhabitants of the islands, or other place, in which the remedy has been successfully applied; such *certificates* to be delivered to the Society on or before the first Tuesday in January, 1813.

181. Cultivation of Hemp in Upper Canada. To the person who shall sow with hemp the greatest quantity of land in the province of Upper Canada not less than six arpents, (each four-fifths of a statute acre) in the year 1811, and shall at the proper season cause to be plucked the summer hemp, or male hemp bearing no seed, and continue the winter hemp, or female hemp bearing seed, on the ground until the seed is ripe; the gold medal, or one hundred dollars.

182. To the person who shall sow with hemp the next greatest quantity of land in the same province of Upper Canada, not less than five arpents in the year 1811, in the manner above mentioned; the silver medal, or eighty dollars.

183. For the next greatest quantity of land, in the same province, and in a similar manner, not less than four arpents; sixty dollars.

184. For the next greatest quantity of land in the same province, and in a similar manner, not less than three arpents; forty dollars.

185. For the next greatest quantity of land in the same province, and in a similar manner, not less than one arpent; twenty dollars.

Certificates of the number of arpents, the method of culture, of the plucking of the hemp, with a general *account* whether sown broad-cast or in drills, the expense, soil, cultivation, and produce, to be transmitted to the Society, certified under the hand and seal of the governor or lieutenant-governor, together with 28 lb. of the hemp, and two quarts of the seed, on or before the last Tuesday in April, 1813.

186 to 190. In Lower Canada. Premiums exactly similar in all respects to those held out for the province of Upper Canada, are also offered to the province of Lower Canada.

191 to 195. In Nova Scotia and New Brunswic. Similar premiums in all respects are also offered to the provinces of Nova Scotia, and New Brunswic.

196 Importation of Hemp from Canada, Nova Scotia, and New Brunswic. To the master of that vessel which shall bring to this country the greatest quantity of marketable hemp, not less than one hundred tons, in the year 1812, the produce of Upper Canada, or of one of the above-mentioned provinces; the gold medal.

197. To the master of that vessel which shall bring the next quantity, not less than fifty tons; the silver medal.

Certificates satisfactory to the Society, to be produced by the master of the vessel on or before the first Tuesday in February, 1813, to testify that such hemp was grown and prepared in Canada, Nova Scotia, or New Brunswic.

198. Substitute for Hemp. To the person who, in the year 1812, shall discover and produce to the Society, a substitute for hemp, equally cheap, durable, and applicable to all the purposes for which hemp is now used; the gold medal, or fifty guineas.

A quantity of the substitute, not less than one hundred weight, together with proper *certificates* from the governor or commander in chief, if raised in any of the British colonies, or from the Secretary of the Board of Trade, if raised in the East Indies, to prove that the same has been used with success, to be produced to the Society on or before the last Tuesday in February, 1813.

N. B. The premiums for Nos. 181, *to* 198, *are all extended one year further, on similar conditions. Certificates to be produced at the same time of the year ensuing.*

199. Silk. For the greatest quantity of silk proper for manufactures, not less than one hundred pounds weight produced by any person in Malta, or islands near adjacent thereto, in the possession of Great Britain in the year 1813, from silk-worms bred there; the gold medal, or fifty guineas.

Specimens of the silk, not less than one pound, with an *account* of the method in which the silk-worms were managed; the kind and size of the mulberry-trees from whence they were furnished with food, and particulars respecting the culture of the mulberry-trees for that purpose, to be produced to the Society on or before the first Tuesday in March, 1814.

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200. For the next greatest quantity, not less than fifty pounds, on similar conditions; the silver medal, or twenty guineas.

Satisfactory *certificates* from the governor or commander in chief of the district where the said silk was produced, and of the several particulars above-mentioned, to be delivered to the Society along with the samples required.

N. B. The same premiums, on similar conditions, will be given for silk produced in the years 1814 and 1815, *certificates* to be sent at the same time of the years ensuing.

PREMIUMS OFFERED FOR THE ADVANTAGE OF THE BRITISH SETTLEMENTS IN THE EAST INDIES.

201. Bhaugulpore Cotton. To the person who shall import into the port of London, in the year 1812, the greatest quantity, not less than one ton, of the Bhaugulpore cotton, from which cloths are made in imitation of nankeen, without dyeing; the gold medal.

A quantity of the cotton, not less than five pounds weight, in the pod, and five pounds carded, to be produced to the Society, with proper *certificates*, signed by the Secretary of the Board of Trade of Bengal or Bombay, on or before the last Tuesday in February, 1813.

202. Annatto. To the person who, in the year 1812, shall import into the port of London, from any part of the British settlements in the East Indies, the greatest quantity of annatto, not less than five hundred weight; the gold medal.

A quantity of the annatto, not less than ten pounds weight, to be produced to the Society, with proper *certificates*, signed by the Secretary of the Board of Trade of the respective settlement, that the annatto is the produce of such settlement, on or before the last Tuesday in February, 1813.

203. True Cochineal. To the person who, in the year 1812, shall import into the port of London, from any part of the British settlements in the East Indies, the greatest quantity of true cochineal, not less than three hundred weight; the gold medal.

A quantity of the cochineal, not less than three pounds weight, with proper *certificates*, signed by the Secretary of the Board of Trade of the respective settlement, that the cochineal is the produce of such settlement; to be produced to the Society on or before the first Tuesday in February, 1813.

N. B. The premiums from No. 201 *to* 203 *inclusive, are all extended two years further on similar conditions. Certificates to be produced at the same time of the years ensuing.*

GENERAL CONDITIONS.

AS the great object of the Society in rewarding individuals is to draw forth and give currency to those inventions and improvements, which are likely to benefit the public at large, candidates are requested to observe, that if the *means*, by which the respective objects are effected, do require an expense or trouble too great for *general purposes*, the Society will not consider itself as bound to give the offered *reward*; but, though it thus reserves the power of giving in all cases such part only of any premium as the performance shall be adjudged to deserve, or of withholding the whole if there be no merit, yet the candidates may be assured the Society will always judge liberally of their several claims.

All candidates are to take notice, that no claim for a premium will be attended to, unless the conditions of the advertisement are fully complied with.

All models of machines, which obtain premiums or bounties, shall be the property of the Society; and, where a premium or bounty is given for any machine, a perfect model and description thereof shall be given to the Society.

All the premiums of this Society are designed for Great Britain and Ireland, unless expressly mentioned to the contrary.

The claims shall be determined as soon as possible after the delivery of the specimens.

It is expected that all articles for claims or bounties be sent to the Society, carriage paid.

No person shall receive any premium, bounty, or encouragement, from the Society, for any matter for which he has obtained, or purposes to obtain, a patent, or for which he has obtained, or expects any premium or reward from any other Society.

A candidate for a premium, or a person applying for a bounty, being detected in any disingenuous method to impose on the Society, shall forfeit such bounty, and be deemed incapable of obtaining any for the future.

No member of this Society shall be a candidate for, or entitled to receive, any premium, bounty, or reward whatsoever, except the honorary medal of the Society. The candidates are, in all cases, expected to furnish a particular account of the subject of

their claims; and where certificates are required to be produced in claim of premiums, they should be expressed, as nearly as possible, in the words of the respective advertisements, and be signed by persons who have a positive knowledge of the facts stated.

Where premiums or bounties are obtained in consequence of specimens produced, the Society mean to retain such part of those specimens as they may judge necessary, making a reasonable allowance for the same.

No candidate, not a member, shall be present at any meeting of the Society or Committees, or admitted at the Society's rooms, after they have delivered in their claims, until such claims are adjudged, unless summoned by the Committee.

The Society, anxious to promote the Arts of their country, have adopted the resolution of forming a Collection of Prints, to be open for public inspection; and, having arranged those already in their possession, invite engravers to send etched or finished proofs of their plates; and hope that amateurs, collectors, and publishers of works of art, will also contribute to the undertaking.

Prints of machines, or maps, will also come within the above arrangement.

The Society further invite the communications of scientific and practical men, upon all subjects connected with the views of the Society, although their experiments may have been conducted upon a smaller scale than the terms required by the premiums; as such communications may afford ground for more extensive application, and thus materially contribute to the advantage of the public.

The Library of the Society, which has already become very valuable, may yet receive considerable additions and improvements from the presents of members, or other persons who may be inclined to place useful books or valuable manuscripts in a repository, at once permanent and conducive to the national benefit.

All communications are to be made by letter, addressed to CHARLES TAYLOR, M. D. the Secretary, *at the Society of Arts, &c. Adelphi, London.*

And where articles are sent by Sea for the Society, the Bills of Lading are to be addressed to the care of WILLIAM VAUGHAN, Esq. *Mincing-lane, London,* who has politely undertaken to receive them for the Society.

The Winchester bushel is the measure referred to for grain; and, as the acres of different districts vary in extent, it is necessary to observe, that the Society mean Statute Acres of five and a half yards to the rod or pole, when acres are mentioned in their list of premiums; and they request that all communications to them may be made agreeably thereto.

The Society desire that the Papers on different subjects sent to them may be full, clear, and explicit, fit for publication, and rather in the form of Essays than of Letters: and that descriptive Drawings may be sent, with the Models and Machines laid before the Society.

*** To persons inclined to leave a sum of money to this Society by will, the following form is offered for that purpose.

Item. I give and bequeath to A. B. and C. D. the sum of upon condition and to the intent that they, or one of them, do pay the same to the Collector, for the time being, of a Society in London, who now call themselves the Society for the Encouragement of Arts, Manufactures, and Commerce; which said sum of I will and desire may be paid out of my personal estate, and applied towards the carrying on the laudable designs of the Society.

N. B. The Society considering that it would be beneficial to the Commerce of the United Kingdom to bring the British Marbles into more general use, and that the most effectual method of accomplishing their object would be, for the present, *to make them more generally known in the capital, have come to the following resolutions:—*

Resolved.—That specimens of British Marbles be exposed in the Society's Rooms, in the Adelphi, for the inspection of the public, under the following regulations:

1st. That all the specimens be exact to a given size, *viz.* eight inches high, six inches broad, one inch thick, and polished on one face.

2. That a book be kept, containing the number of each specimen, and describing the situation of the quarry, the name of the parish where situated, the distance of the quarry from a beaten road, and the distance of that road from water-carriage, with the name of the donor and proprietor. Any remarks on the qualities of the marbles, or on the lime produced from them, will be gratefully received and preserved by the Society, as materials for future inquiries.

Resolved,—That as the exertions of the Society can be generally beneficial, only inasmuch as their views are seconded by the public, the Society request, that all persons proprietors of marble quarries, will favour them with a specimen of the marble, worked to the exact size above mentioned, with the description of the quarry as above, that the same may be entered in the book to be preserved for the use of the public. By such arrangements, it is expected that the interest of the proprietors of the quarries will be promoted, and the use of British marble much extended. A variety are already exhibited in the Society's Great Room.

The Society take this opportunity of returning their thanks to the several Societies and Individuals, who have favoured them with presents for their Repository and Library.

Premiums and Rewards bestowed by the Society of Arts, Manufactures, and Commerce, Adelphi, during their Session, which commenced on the fourth Wednesday in October, 1811, *and closed on the 3d of June,* 1812.

ON Tuesday the 26th of May, his Grace the DUKE of NORFOLK, the President, distributed the Rewards then adjudged.

IN AGRICULTURE.

To Dr. H. Ainslie, M.D. Dover Street, for his plantations at Grizedale in Lancashire of 251,240 Forest trees. Class 14. The gold medal.

To the Rev. Dr. Francis Haggitt, D. D. for his improvement of fifty acres of land lying waste at Pittington near Durham, Class 41. The Gold medal.

To John Austin, Esq. of Grange near Strabane in Ireland, for gaining 300 acres of land from the sea, Class 39. The gold medal.

To J. C. Curwen, Esq. M. P. of Workington-hall in Cumberland, for his improved method of feeding Milch Cows. The lesser gold medal.

To John Finch, Esq. of Red Heath near Watford, Herts, for one hundred and twenty three stocks of bees, Class 26. The silver medal.

To Major Bryan Hesleden, 1st West York Regiment, for improving 21 acres of boggy land at Clapham in the County of York. The lesser silver medal.

To J. H. Moggridge, Esq. Laurumney near Newport, Monmouthshire, for his remarks and experiments on the growth of forest trees. The lesser silver medal.

To Mr. Miles Braithwaite of Kendal in Westmoreland, for his plantation of 60,000 timber trees near Hawskhead in Lancashire. The lesser silver medal.

To C. T. Skurray, Esq. of Alverdiscot near Barnstaple, for the culture of spring wheat. The silver medal.

To Mr. James Ogden, of Dukinfield in Cheshire, for his improved instrument for pruning timber trees. Ten guineas.

IN CHEMISTRY.

To Mr. Charles Wilson, No. 35, Worcester Street, Borough, for a substitute for Portland stone chimney pieces. Twenty-five guineas.

To Mr. R. D. Cuthery, 9, Mead's Row, near the Asylum, Lambeth, for transparent paper for the use of Engravers and Painters. Five guineas.

IN POLITE ARTS.

To Miss Adair, Great Cumberland Place, for an original drawing of flowers. The silver medal.

To Miss Phillipps of Wandsworth Road, for an original landscape, a view of Caernarvon Bay. The lesser silver medal.

To Miss Lucy Adams, of Bellericay, Essex, for an original historical drawing of the raising of the Widow's Son at Naim. The lesser silver medal.

To Miss Margaret Geddes, Alderbury near Salisbury, for an oil painting, a copy from Guido. The lesser silver medal.

To Mr. W. H. Harriott, Clipstone Street, Fitzroy Square, for a view of Trossac Mountains, a copy, class 99. The silver medal.

To Mr. Henry Parke, Dean Street, Soho, for an original painting of shipping, a view at the Nore. The silver medal.

To Master Frederick Yeates Hurlestone, King Street, Covent Garden, for a drawing of the head of Neptune, a copy. The silver pallet.

To Miss Henrietta Eyre of Reading, for a chalk drawing of a Magdalen, a copy, class 99. The silver medal.

To Miss M. Sheppard of Uley, in Gloucestershire, for a copy of a drawing from C. Marat. The silver pallet.

To Miss E. E. Kendrick, Upper Mary-le bone Street, for a miniature of Jesus Christ, a study from Guercino. The silver medal.

To Mr. G. R. Pain, Dixon's Place, New Road, for an original design of a Gothick Church, class 106. The gold medal.

To Mr. William Pitts, James Street, Lambeth, for an original model in wax of two Warriors. The lesser gold medal.

To Mr. James Craig, of Charlotte Street, Rathbone Place, for an original etching of the Holy Family. The lesser gold medal.

To Mr. John Hans Wright, No. 33, High Holborn, for an original engraving of a landscape, class 12. The silver medal.

To Miss Elizabeth Craig, Charlotte Street, Rathbone Place, for an original drawing of fruit and flowers. The lesser gold medal.

To Miss Mary Anne Say, Norton Street, Mary-le-bone, for a drawing of two fallen Angels, a copy. The lesser silver medal.

To Miss Maria Violet, Upper James Street, Golden Square, for a miniature drawing, a copy. The silver pallet.

To Mr. John Jones, St. Chad's Row, for a drawing of Mr. Kemble in the character of Coriolanus, class 102. The silver medal.

To Mr. Henry Wyatt, Bedford Row, Holborn, for a drawing of the outline of Antinous, class 102. The silver medal.

To Mr. R W. Sievier, Clarendon Square, Somer's Town, for a pen and ink drawing from the battles of Le Brun. The lesser silver medal.

To Mr. John Petherick, of Penydarron Iron Works, near Merthyr Tidvil, Glamor-

ganshire, for an original drawing of the said Iron Works. The lesser silver medal.

To Mr. William Morrison, Carburton Street, Fitzroy Square, for a drawing of two heads after Raphael. The silver pallet.

To Miss Eliza Hay, Tavistock Street, for a drawing of fruit after an oil painting. The silver pallet.

To Miss Anne Hayter, Wells Street, Oxford Road, for a drawing, Aurora, a copy. The silver pallet.

To Miss Margaret Steele, Union Place, Lambeth, for a drawing of a landscape, a copy. The silver pallet.

To Miss Edwards, Great Suffolk Street, Blackman Street, Southwark, for a drawing of a Shepherd's boy, a copy. The silver pallet.

IN MANUFACTURES.

To Edward Sheppard, Esq. of Uley, in Gloucestershire, for producing from his flocks of 1929 Merino and Merino-Ryland Sheep, in the year 1811, 7749 lbs. of wool, class 137. The gold medal.

To Messrs. Robert and Giles Caymes, of Yeovil, in Somersetshire, for manufacture of sail cloth, proper for the use of the Royal Navy, and superior to the best Dutch, class 146. The gold medal.

IN MECHANICS.

To Mr. Matthew Cooke, No. 10, Winchester Row, Paddington, for a machine, by means of which blind people can both learn and teach music. The gold medal.

To Mr. Thomas Machell, Surgeon, Wolsingham, near Durham, for an annular saw, which can cut deeper than its own centre. The gold medal.

To Dr. George Cumming, M. D. at Denbigh, in Wales, for a vapour, fumigation, or shower bath, adapted at a cheap expence, for the use of public Hospitals or private families. The silver medal.

To Mr. I. Goss, of Enfield, for a mechanical instrument to work addition of numbers with accuracy and dispatch. The silver medal and fifteen guineas.

To Mr. Thomas Perry, of Farnham, in Surry, for a Chirographagist, or instrument intended to form the hand in writing, so as to manage the pen with correctness. The silver medal.

To Mr. Arthur Hodge, Bride Lane, Fleet Street, for a method of preserving butter from becoming rancid in warm weather, or hot climates. Ten guineas.

To Mr. Joseph Davis, Catherine Street, Strand, for a temporary scaffold, by means of which the outside walls of houses may be repaired or beautified with equal safety, and at a less expence than usual. The silver medal.

To Mr. William Bowler, Holborn Hill, for a mechanical method of destroying rats and other vermin. Ten guineas.

To Mr. William Sampson, No. 20, Great Wild Street, for an ingenious churn, by which butter may be easily and quickly made. The silver medal and ten guineas.

To Mr. Joseph Martin, No. 176, Fleet Street, for a method of relieving a horse fallen down in the shafts of a loaded cart. Ten guineas.

To Mr. J. King, No. 4, Mulberry Court, near the Bank, for a machine to enable shoe and boot makers to work without pressure upon the breast or stomach. Ten guineas.

To Mr. David Ritchie, No. 3, Princes Street, Percival Street, Clerkenwell, for a compensation pendulum to prevent the going of a clock, from varying by heat or cold. Twenty guineas.

The LIST of PREMIUMS offered may be had, *gratis*, at the Society's House in the Adelphi.

By Order of the Society,

June, 1812. CHARLES TAYLOR, M. D. Secretary.

N. B. Where errors have arisen in the address of any Member of the Society, information is desired to be given to Mr. R. Elwin, the Collector, at the Society's house in the Adelphi, who receives the Subscriptions from the Members and furnishes Receipts for the same.

Lately was published, Price 10*s.* 6*d.*

THE TWENTY-NINTH VOLUME of the SOCIETY'S TRANSACTIONS, which may be had from the Housekeeper, at the Society's House in the Adelphi. Also complete sets of their Transactions, or any single Volume.

Also, An ANALYTICAL INDEX of the FIRST TWENTY-FIVE VOLUMES of the TRANSACTIONS of the SOCIETY, to the Termination of their Session, June 1807, price 5s.

A CATALOGUE of the BOOKS in the Society's Library may be procured as above, price One Shilling.

R. Wilks, Printer, 89, Chancery-lane, London.

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PAPERS

IN

AGRICULTURE.

The GOLD MEDAL, *being the Premium offered in Class* 14 *for Plantations of Forest Trees, was this Session adjudged to Dr.* H. AINSLIE, *M. D. of Dover Street, for his Plantations of* 151,240 *Forest Trees, at Grizedale in Lancashire. The following Communications were received from him.*

SIR,

HAVING determined to plant a large Intack of 77 Acres 30 Perches, part of a barren common long since inclosed and fenced round with a stone-wall six feet high, I selected 16 acres of it which were much exposed, and planted them in the year 1807, with 22,700 Larches, 3,700 Oaks, and 2000 Scotch Firs. I expected these plants would break the force of the winds and protect those I might plant at a future period.

 The

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The remaining part of this intack I planted in the Spring of 1809, with 96,150 Larches, 10,300 Scotch Firs, 3,400 Oaks, 1,990 Beech, and 1000 Spanish chesnuts. In the winter of the same year I filled all the vacant spots with 10,000 Larches;—the Plantation therefore contains 151,240 Forest Trees, of which 28,400 were planted in 1807 — 112,840 in Spring 1809, and 10,000 in the following Winter. The certificates I annex refer to the 112,840 planted in Spring 1809, but the whole are included in the expression of their flourishing state.

The Society will consider me as merely presenting them with an account of my having planted 112,840 Forest Trees upon 61 acres in the Spring of the year 1809; and I shall be happy if the following observations respecting the whole of my plantations for 22 years, should be thought deserving of their notice. The total of Forest Trees I have planted is 378,563.

I am, Sir,

Your very obedient Servant,

H. AINSLIE.

25, *Dover Street, Nov.* 29, 1811.

To C. Taylor, M. D. Sec.

Since I had last the honour of presenting myself to the Society of Arts, &c. as a Candidate for one of their Honorary Rewards to planters of forest trees, I have not been idle in a pursuit which has given me so much pleasure. Unfortunately, however, I am tied down by my profession so closely to the metropolis, that I have only been able to visit my plantations once in two years, and never in

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in one Season to dedicate more than a week or ten days to their management. This time, short as it is, has not been thrown away, and as what I have done has answered my expectations, it may meet the wishes of the Society to be made acquainted with it;—and I am the more induced to submit some observations to them, because I find in their Annual Publications, many accounts of putting trees into the ground, but few of their treatment afterwards.—Upon subsequent treatment, however, every thing depends, for I agree with an old gentleman who many years ago told me, that any fool could plant, but only a wise man could rear timber. The difficulties I felt in my first attempts would have been much lessened had I sooner had the advantage of seeing the excellent papers presented to the Society by Mr. Waistell, published in their 26th Vol.; —they have been invaluable to me, and cannot fail to prove so to all planters.

I cannot express the mortification I felt in passing some large plantations of Firs, in my way to and from the North of England last year. For thirty years, I can venture to say, no axe has been near them, and the trees now stand disgraceful poles forty feet high and at three and four feet asunder. These trees never will be timber.—I saw Oaks in the same predicament, as close as they usually stand in nurseries twenty-five or thirty feet high, and not three inches in diameter—I cannot perceive any merit in such sort of planting—No man will ever plant to profit who does not go through his plantations early with an axe in his hand and a cold calculating heart. Nothing can be more unpleasant than to cut down a thriving tree, but it must be done, or you will have no timber. I have not hitherto thinned my plantations on any regular principle, nor do I know any mode I could recommend under all circum-

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stances. It is to be recollected that I speak of plantations of larches and firs planted four feet asunder. I had permitted my earliest plantations to grow without attention to them for ten or twelve years. I found the trees choking each other, and set about correcting my error the best way I was able. I cut down about a fourth part of them. For two or three years they increased little in girth, but shot up near two feet annually. I cut down a fourth of the remainder. In two years more they were much improved, but many of them had a rigidity in the bark, which is an infallible sign of their being too close. I again thinned them more moderately, and in two years the bark was burst in almost every tree. One tree which I measured at six feet was actually increased in circumference five inches. This plantation was in the centre of a copse and particularly well sheltered. All my other plantations are more exposed, and not being so much drawn up, were taken in time, and have cost me little trouble. The plan I now pursue, is to begin thinning in eight years. I mark the rows of inferior trees, which are always to be found, and cut them all down. I cross in every direction, as the smaller trees present themselves, and wherever I find a weak plant, it falls. The first thinning takes away about one in four. In two years more I attack them again. I cut down every row of second rate trees, and when I come to a parcel of equal size, I cut down one in three. Proceeding in this manner, cutting down one tree in four at each thinning, I find I give sufficient air, but never too much; regularity I utterly neglect, because after three or four thinnings, the trees are certain to be at proper distances. I will now mention the effect of this treatment:—My larches of twenty years growth average from twenty-two to twenty-

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twenty-four inches in circumference at six feet. The Scotch firs in favourable situations do the same; in very exposed ones the average is from seventeen to twenty. The heighth of the former is from thirty-six to forty feet, of the latter from thirty to thirty-six feet. I purpose to thin these plantations again in 1812, and 1815, at which latter period they will be twenty-six years old, and every tree will contain six feet of square timber, and many of them upwards of ten. There will then be about seven hundred on each acre, the subsequent treatment of which will depend upon circumstances I cannot at present foresee. My larches of fourteen years growth, which were thinned in good time, average from fifteen to eighteen inches in circumference at six feet, so that I have not the least doubt of their far exceeding my first plantations*. I said, that the tall firs I saw in the North Road *never* would be timber, and I think I can prove it from what has occurred to myself. I have two hundred Scotch Firs, which are about sixty years old; when they were thirty-five years old they had never been thinned, and were nearly fifty feet high, with very little head. These trees have been carefully thinned at intervals; they now, at sixty years, average fifteen feet of timber only. What they would have contained had they been treated properly, may be known from viewing about a score of them planted in a hedge-row adjoining, each of which

* In the Bishop of Landaff's report of his first larch plantations, then twenty or twenty-one years old, I find that the circumference at six feet was on an average eleven inches. They are on *very high and exposed* ground. Mr. Curwen mentions his having used larches sixteen years old for his rail-roads, and says they squared 4½ or 5 inches each. A tree which squares 5 inches, must be 21 inches in circumference.

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contains between forty and fifty feet of timber. Had I cut down these Firs twenty-six years ago, I should have had four times the number of Larches nearly the same size upon the ground they at present cover. I formerly mentioned that the utmost value of the land I had planted, was 1*s.* or 1*s.* 6*d.* an acre, per annum. As I have generally selected intacks already well fenced, the expense of fencing has been inconsiderable. I have within the last twenty-one years, planted 378,563 Forest trees; about 25 or 30,000 Larches, surround my copse woods; the rest are in clumps of unequal dimensions, from seventy-seven acres to half an acre. The whole expense of plants, planting, fencing, and preserving, with compound interest, does not exceed 1000*l.* It is no idle speculation to look forward to what may be the value of 50,000 Larches, of forty years growth, nor to what the thinnings of the plantations may produce in the interim; and I trust it will be found that I have converted bad land to a good purpose, at as little expense as any planter in the kingdom.

As I have not confined myself to planting Larches and Firs only, but have also planted many thousands of Oak, Ash, Beech, and other trees, I would add a few words upon my management of Oaks. My plan has been to mix them with Larches and Firs, and to cut them down to the ground in about three years, and I find in a few years more, that they spring up in abundance, and shew themselves on the first thinning of the Larches. In two or three years I give the Larches a much more severe thinning, so as to leave the Oaks plenty of room, and I find that they shoot up rapidly. The land is much too high and exposed, to permit Oaks to grow without the protection of Larches; but the soil is so much improved by the dead leaves, grass, and fern, that I have not the least doubt

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doubt of rearing very fine Oaks on this poor land. In compliance with the request of Mr. Waistell, I have measured a great number of Larches of different ages, and shall continue to do so for some years to come. My intention is not to take trees promiscuously, but those I should call the second best in each plantation, as there are always twice the number of that kind, that can possibly be left to stand for timber, and all the inferior trees will of course be cut down first. I shall not fail to inform the Society if any thing occurs in the course of my experiments worthy to be communicated, or likely to be of service.

H. AINSLIE,

Dover-street, Nov. 29, 1811.

CERTIFICATES.

The following Certificates have been received, in corroboration of Dr. Ainslie's account of his Plantations.

I, WILLIAM DIXON, farmer to Dr. Ainslie, in Grizedale, do certify, that in the spring of the year 1809, I planted for him in an inclosure called Great Intack, containing sixty-one acres, 112,840 Forest trees, viz. 96,150 Larches, 10,300 Scotch Firs, 3,400 Oaks, 1,990 Beeches, and 1000 Spanish Chesnuts; and in the course of the following winter, filled up the ground with 10,000 additional Larches, making in all, 122,840 trees; and that I have constantly overlooked the above plantation, which is at this date, November 27, 1811, in a flourishing condition.

Signed, WILLIAM DIXON.

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The Rev. THOMAS CLARKE, of Satterthwaite, and JOHN ROMNEY, Esq. of Woodstocke Hall, near Ulverston, wrote to the Secretary, confirming the foregoing Certificate, as to the healthy, and flourishing state of Dr. Ainslie's plantations, and that the same are well fenced.

The GOLD MEDAL, *being the Premium offered in Class 39, for gaining Land from the Sea, was this Session adjudged to* JOHN AUSTIN, *Esq. of Grange, near Strabane, in Ireland, from whom the following Communication was received.*

SIR,

I BEG leave to inform you, that by a gentleman who was lately in London, and who got a few days ago one of the premium books of the Society of Arts, &c. for 1810, I observe that there was bestowed to J. Stockdale, Esq. of Cark, Lancashire, and R. Towers, Esq. of Dudden Grove, Cumberland, for gaining five hundred and sixty-four acres of land from the sea, at Windermere, Lancashire, Class 34, their Gold Medal. This information of the Society, induces me to request you will have the goodness to inform the Society, that I trust they will consider my claim, in having in 1806, embanked about three hundred Scotch acres of a swampy marsh, on the lands of Grange, in the county Tyrone, situated on the Foyle, which runs past London-Derry, distance from the city 6½ miles, over which at spring tides the whole surface was covered;

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covered, and frequently by neap tides also, which rendered the entire marsh nearly useless; covering it from one to four, and sometimes five feet deep of water. *By the embankment,* and drains from six to four feet in depth, together with necessary roads, the land is now in good cultivation, giving in meadow grass, from three to four tons of hay per acre; the same is lett at an average of 6*l.* per acre; other parts are in oats and potatoes, generally productive; and remainder in the act of being reclaimed. Also in 1808, I embanked at the same place, and attached to the former improvement, an island and marsh, containing nearly one hundred acres; and now on the marshy land, over which boats of large burden plyed, oats have been reaped this season, worth 10*l.* per acre, and some even sold at eleven. These works have been done at a most serious expense, almost ruinous to me; but I should feel much gratified in being noticed by your highly dignified Society, in any manner they may think me worthy, and would wish in person to lay before them such proofs as you think necessary for their further satisfaction; and hope you will have the goodness to let me know, what time in October I may be permitted to wait on the Society.

I have the honour be,

with much deference and respect

to your Honourable President and Society,

Your obedient,

and very humble servant,

JOHN AUSTIN.

Grange, near Strabane, Sept. 21, 1811.

To C. Taylor, M. D. Sec.

Certificates.

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Certificates.

The following Certificates were sent to the Society, in corroboration of Mr. Austin's statement.

We the undernamed do certify, that Mr. John Austin, of Grange, parish of Donaghedy, Barony of Strabone, county of Tiron, did in 1806 commence the embankment of the low lands of Grange, situated on the river Foyle, distant from Derry about seven miles; over which at spring tides the whole surface was covered, and frequently at neap tides also; which rendered the ground nearly useless, covering the surface from one to three, four, and sometimes five feet of water; and by completing the embankment, together with draining, making of roads, &c. through the same, the land is now in good cultivation, that which is in meadow giving from three to four tons of hay per acre, other parts of it in oats and potatoes generally productive. Also in 1808, that he embanked at the same place and attached to the former improvement an island and marsh containing about one hundred acres; and on the marsh where boats of large burthen formerly plied remarkable good oats have been reaped this season; the whole land enclosed being rendered extremely productive from its low marshy state of waste. We beg leave to recommend Mr. John Austin, from his industry, care and attention, in accomplishing the same, as worthy the attention of your highly honourable Society. November 19, 1811.

Stewart Hamilton, Rector of Camas.
Arthur Hamilton, Rector of Donaghedy.
J. Hamilton, Collector of Strabane.
James Hamilton, Justice of Peace for Tyron.

To C. Taylor, M. D. Sec.

My

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My dear Doctor,

The gentleman who will have the honour of delivering you this letter, is Mr. Austin, of Grange, in the county of Tyrone; he has embanked a very considerable quantity of land that was subject to be flooded by the river Foyle, and has had great crops of corn where snipes used to occupy the land. He wishes to obtain the gold medal from the Society of Arts, &c. in London.

I remain,

My dear sir,

Yours always very truly,

R. FOWLER.

Urney-House, Dec. 9th, 1811.

To Dr. Richardson.

The Rev. Archdeacon Fowler who writes this letter, and recommends Mr. Austin so strongly, I am confident would not do it without full conviction of his merit, and knowledge of the value of the improvement from inspection.

W. RICHARDSON.

Clonfeeb-House, Jan. 31, 1812.

To C. Taylor, M.D. Sec.

DEAR SIR,

This will be delivered to you by Mr. Austin, who has reclaimed much land from the tide-water in the county of Tyrone,

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Tyrone, and I believe is well entitled to a premium, which Society of Arts, &c. have liberally offered to this country as well as to England.

I have the honour to be,

Your most obedient humble servant,

C. VALLANCEY.

V. P. of the Dublin Society.

Dublin Society, Feb. 6, 1812.

To C. Taylor, M. D. Sec.

Having been employed by the Post Masters General, to lay out, and improve, the post roads between Drogheda and London-Derry, I had an opportunity particularly to examine a work of magnitude and importance which I understand was commenced and completed by Mr. John Austin, at Grange, in the county of Tyrone, by enclosing, with an embankment, some hundred acres of marsh on the banks of the river Foyle, which appears to me to be very well and effectually executed, the whole of the said inclosure having been last summer under the heaviest crops of oats and meadow grass I think I have ever seen, and it is evident the entire of the said inclosure was never productive before.

CHARLES COOTE.

Baggot-st. Feb. 12, 1812.

SIR,

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SIR,

I HAVE been favored with yours of the 5th instant; it was my signature that was to Mr. Austin's memorial, and I can give the most unequivocal testimony to the truth of his statement, for his improvements are within five miles of my residence, and I have frequently witnessed them, both in progress, and since their completion, with much pleasure and satisfaction.

I have the honour to be,

Sir,

Your obedient servant,

J. HAMILTON.

Strabane, March 14, 1812.

To C. TAYLOR, M. D. SEC.

The GOLD MEDAL, *being the Premium offered in Class* 41, *for improving Land lying waste, was this Session adjudged to Dr.* FRANCIS HAGGITT, *D. D. of Durham, for his Improvement of fifty Acres of Boggy Land, at Pittington, near Durham. The following Communication was received from him.*

AN account of fifty acres of bog redeemed by under-draining, in the parish of Pittington, in the county of Durham.

The

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The farm called Little Town, in the parish of Pittington, about four miles from Durham, contains fifty acres of land, which were till lately a morass, producing nothing but insulated tufts or hillocks of very coarse grass, and a few stunted sallows, and on which cattle could only go in dry summers; the annual value of the land in that state was, at most, two shillings and six-pence per acre.

Dr. Haggitt (who has only a life interest in the estate as a Prebendary of Durham) had long wished to underdrain this bog, but was dissuaded from the undertaking, on the supposition that a sufficient fall could not be obtained. At length, however, he determined to make the trial, and accordingly began the work in January, 1810, and completed it in July 1811. The drains vary in depth from three to seven feet, according to circumstances, and are laid in the conduit form with side-stones, and a cover, and (wherever it appeared necessary) with flag-stones at the bottom, forming an open space of seven inches by five for the passage of the water. But a difficulty occurred in many places on account of quick-sands, which were so loose and soft that the stones would have sunk in them; to obviate which, planks were laid at the bottom for the side walls to rest upon, with shoulders to prevent the stones from slipping inwards on the boards; and by this contrivance any dislocation of the drain was effectually prevented.

The soil, which is now laid perfectly dry, proves to be a rich strong loam; and the tenant, William Lynn, although he had a lease of the farm, of which several years are unexpired, consented to give immediately forty shillings per acre for the newly-drained ground; and accordingly he now pays one hundred pounds per annum for the fifty acres before-mentioned, which is considered a very moderate

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moderate rent, although the rest of the land on the same farm is let below the average of twenty shillings per acre. The drained ground has been since divided into seven fields, by quick-set hedges. Most of it has been ploughed (at first with great difficulty) and is intended to remain in tillage; and has already produced good crops of oats or turnips.

The whole expense of cutting the drains, quarrying and leading the stones, laying and filling-in, amounted to 822*l.* 2*s.* 4*d.*; and the timber for planking cost 25*l.*

FRANCIS HAGGITT.

Durham College, Jan. 21, 1812.

To C. Taylor, M. D. Sec.

Certificates.

I hereby certify, that I set out and superintended the work described in the foregoing statement, and that the account of the state of the ground before draining, the value since the drainage, the manner and expense of the operation, and all the particulars mentioned in the foregoing statement are true. As witness my hand,

M. WOODIFIELD, Surveyor.

Durham College, Jan. 21, 1812.

I, William Lynn, the tenant of Littte Town farm, in the parish of Pittington, and county of Durham, do hereby certify, that there were fifty acres of drowned swampy ground in my farm, which, on account of its wet state, could only be stinted by young cattle about two months in the year; it is now completely underdrained by stone conduits, and the improvement is so great, that I have

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have agreed to give a rent of forty shillings per acre for it, for the residue of my term in the farm. Given under my hand this 21st day of January, 1812.

W. LYNN.

The LESSER SILVER MEDAL *of the Society was this Session voted to Major* BRYAN HESLEDEN, *1st West York Regiment, for improving twenty-one Acres of Boggy Land, at Clapham, in the County of York. The following Communications were received from him, a wood Engraving is annexed, and the original plans are preserved in the Society's Repository.*

SIR,

I REQUEST you to lay before the Society of Arts, &c. the following improvement in agriculture; namely, the converting of a quantity of morass or boggy marsh, which had been hitherto perpetually covered with water, into good pasture and grazing land, by means of drains, &c. This I accomplished in the course of last year, at a considerable expense; the mode I adopted, and other particulars of the undertaking, I have inclosed in this letter, they are authenticated by the surveyor, clergyman, and other inhabitants of the parish where the same is situated. I hope the bringing of so much land into cultivation, which till then had been useless and of no value whatever, will be deemed worthy of the attention of the Society.

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Society. The execution had been thought impracticable, from its being surrounded on all sides by a hill.

I have the honour to remain,

Sir,

Your obedient humble servant,

BRYAN HESLEDEN,

Major 1st West York Regiment.

Portchester Castle, May 24, 1811.

To C. Taylor, M. D. Sec.

The following method has been adopted for the improvement of a piece of morass or marshy ground, called the Tarn, which before was constantly laid under water, (for the form of it see the annexed plan) and surrounded on all sides by a hill. A leading or main drain has been carried through it, commencing at the south-east, and terminating at the north-west extremity; in effecting this, hitherto supposed impracticable, though desirable object, considerable expense was incurred, on account of its great length and depth, the former being upwards of one hundred and sixty yards, and the latter from six to twelve feet, attended with additional expense, as well as the difficulty of cutting through rocks in several parts of its course; this arduous and expensive undertaking being accomplished, it was deemed indispensably necessary, that cross drains should be cut in such a manner as to form a junction with the main drain, the said drains being from seven to ten yards distance from each other, and a yard deep, flagged in the bottom, soughed and walled with stone, at least eight inches from the bottom, and covered with flat stones, and afterwards filled up with earth.

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The main drain, including the cross ones, makes a total of 8,520 yards of draining, or thereabouts: and in order to bring it into pasture and meadow ground, between two and three thousand horse loads of lime have been spread upon it, each load being from six to eight yards distance from each other, according to the quality of the soil.

Certificates.

I do hereby certify, that a certain piece of ground called the Tarn, in the parish of Clapham, and county of York, containing twenty-one acres, three roods, and ten perches, has been improved by Major Hesleden, as before described. As witness my hand this 28th day of February, 1811.

(Signed) John Matthew Hodgson, Surveyor, inhabitant of Clapham.

This is to certify, that Bryan Hesleden, Esq. Major in the 1st West York Regiment of Militia, has completely drained, improved, and converted into good land, a marsh, which was before perpetually covered with water, forming a lake of twenty-two acres, or thereabouts, called the Tarn, situated in the parish of Clapham, and county of York. Witness our hands this 28th day of Feb. 1811,

John Whaley, Curate of Clapham.
Thomas Foster, and Edmund Robinson, Landholders.
William Lupton, Church-Warden, Clapham.

SIR,

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SIR,

HAVING been informed that the session of the Society of Arts, &c. is about to commence, I take the liberty of addressing you again on the subject of my becoming a candidate for a premium, for the improvement of a certain extent of land, called the Tarn, situate in the parish of Clapham, in the West Riding of Yorkshire, the particulars of which I have already had the honour of transmitting to you in May last. I beg leave to remark further on the subject, that although the land so improved does not consist of more than twenty-one acres, (which was all that remained in that uncultivated state) I trust it will be found to deserve equal merit, as if there had been a greater quantity, since, if there had been more waste, of course I should have completed the whole by the same method I have before described. The land so improved is now enclosed, and the whole of it in grass. Its annual value I consider worth from two pounds fifteen shillings, to three pounds an acre, for either mowing or grazing, (that is for feeding of cattle) thereby gaining and bringing so much land into use for the community, which had till then been a mere waste, absolutely uncultivated, and looked-on as impracticable to drain, &c. from its being surrounded by a hill. I have a plan of the same, which I can transmit to you, should it be thought necessary, and I shall be happy to give any further explanation, with respect to the expenses attendant on, or mode of draining, &c. &c. that may be required, either by letter, or even attendance in town.

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In the mean time you will oblige me in laying the particulars of my claim before the Society.

I have the honour to remain,
Sir,
Your obedient humble servant,
BRYAN HESLEDEN,
Major 1st West York Regiment
of Militia.

Chatham Barracks, Oct. 21, 1811.

To C. Taylor, M. D. Sec.

SIR,

I Take the liberty of transmitting to you, enclosed along with this, a plan of the Tarn, shewing the operation of draining it, &c. &c. together with some further remarks relative to the mode adopted throughout, as also a few hints of my own which I have been able to collect from experience, in this instance, as well as in the improvement of other lands in Yorkshire. I shall feel happy in their proving serviceable to the public, however to land improvers I trust they will be found beneficial. This plan, and other particulars, together with the account sent in my last, I conclude will sufficiently explain every thing requisite to the Society, to whom you will be pleased to present them.

I have the honour to remain,
Sir,
Your obedient humble servant,
BRYAN HESLEDEN,
Major 1st West York Regiment
of Militia.

Chatham Barracks, Nov. 11, 1811.

To C. Taylor, M. D. Sec.

A Plan

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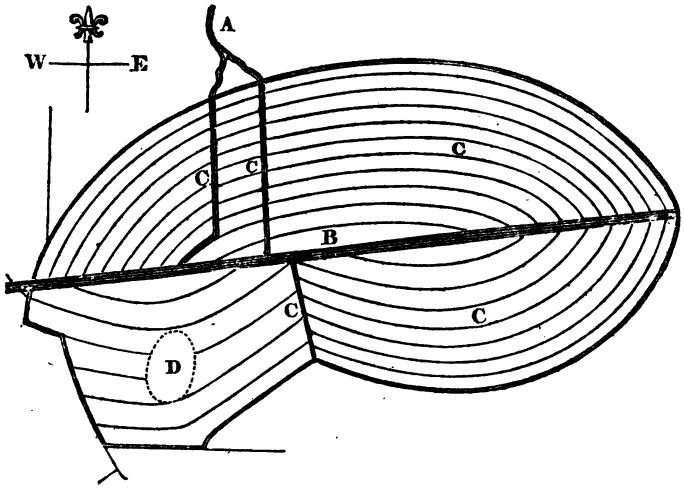
A Plan of Major HESLEDEN'S *Method of Draining the Morass, called the Tarn, at Clapham, in Yorkshire.*



EXPLANATION.

A A spring of water.
B The main drain.
C C C C C Drains of a smaller size in different directions.
D A small piece of dry ground.

Particulars relative to the Drainage of the Tarn, shown in the above Plan.

THIS plan describes the direction in which the principal or main drain, as also the cross drains, were severally carried. From its being encompassed on all sides by

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rising ground, the water was observed to spring from the bottom of the hill; consequently the first drain was taken along its base and boundary of the Tarn, so as to receive the water on its first approach; the others were taken in the same direction, some of which, near the outward side, were made at the distance from seven to ten yards, but near the centre, at a greater distance, (viz.) ten to fifteen yards from each other according to the dryness of the land. The principal, as well as the cross drains, were finished in the best possible manner, the bottom of them being invariably flagged, or laid with flat stones, (except in a few instances that happened to be firm clay,) previous to its being walled on both sides, or soughed, then covered with flat stone, and afterwards filled to the top with earth and sod, which would be above the stone from one foot to half a yard in thickness. This mode of draining I would recommend to be always adopted, provided a sufficient quantity of stone can be procured, even if the expense attending it should be somewhat great, since it evidently must ensure its durability almost for ever,—when in the ordinary way of draining, without first flagging, or laying the bottom with stone, it will in no great space of time give way by undermining the walling, or soughing part, besides being more liable to fill or choke up with earth or sediment. It would also be adviseable to adopt (as was done in this instance with good effect) the letting, in lots, of a given number of roods each, the cutting, stone-digging, soughing, or walling, &c. to different workmen; as best calculated to ensure the well finishing and due performance of each work.

The draining being completed, covered, sodded, and levelled, and the same covered with lime, in the proportion before-described, and after adopting the greatest economy

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economy in the expenditure of this undertaking, the whole expense will be nearly as follows:

	£.	s.	d.
The main drain, cutting and blowing up of the rock, and carrying through the hill, (the extent and depth described in a former account) so as to gain a sufficient fall -	92	15	0
The cross and other drains, in the Tarn -	181	7	0
Covering the whole with lime - -	91	0	0
£.	365	2	0

Although in the statement before made, I calculated the value of the land, in its improved state, to be worth, for the first two or three years, only from two pounds ten, to five pounds fifteen shillings per acre, I have not the least doubt, from the experience I have already had in laying lime upon the surface of land of that description, and in the same neighbourhood, that from the end of the first three years, it will be worth afterwards, and for some time, (for grazing or fattening of cattle) from three pounds ten, to three pounds fifteen shillings per acre, consequently paying for the money so expended, at least eighteen or twenty per cent.

BRYAN HESLEDEN,
Major 1st West York Regiment
of Militia,

SIR,

AGREEABLY to your request of the 5th instant, I avail myself of the earliest opportunity of informing you, that

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the account delivered to you by Major Hesleden, bearing my signature, respecting the draining and improving of a certain parcel of land (twenty-one acres) situate in the parish of Clapham, is correct; I did not sign it from the statement of others, but was enabled to attest its truth from accurate observation. The Morass or Tarn, now converted into fine arable land, will, I am persuaded, induce other gentlemen in the vicinity to adopt a similar mode of improvement, now they are convinced to what perfection such like land is capable of being brought. Major Hesleden is strenuous in cultivating some of his other estates, and employs a great number of the labouring poor in draining, &c. leaving the merits of his claim to be appreciated by your honourable Society.

I remain,

most respectfully,

Sir,

Your obedient servant,

JOHN MATTHEW HODGSON.

Horton, in Ribblesdale, near Settle, Yorkshire,
March 12, 1812.

To C. Taylor, M. D. Sec.

The

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The LESSER SILVER MEDAL *was this Session voted to* J. H. MOGGRIDGE, *Esq. of Laurumney, near Newport, Monmouthshire, for his Experiments and Remarks on the growth of Forest Trees. The following Communications were received from him.*

DEAR SIR,

I HAVE inclosed a table of observations made on the growth of trees by a very intelligent friend of mine, Mr. Moggridge, (late High Sheriff for the county of Gloucester) which I could wish Mr. Waistell to see, and will, I think, be found well deserving of the Society's attention.

I am,

Dear Sir,

Yours very respectfully,

SAMUEL GALTON.

Duddeston, near Birmingham,
May 24, 1810.

TO C. TAYLOR, M. D. SEC.

Admeasurements

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Admeasurements of the progressive growth of Timber Trees by Mr. John H. Moggridge, in a Plantation of four Acres made by him, in the year 1798.

	1805. April 11.	1805. Aug. 22.	1806. July 1.	1806. August.	1807. June.	1808. June.	1808. Oct. 3.	1809. June.	1809. October.		Height October 1809. Feet.
Larch east side	1 3	1 6	1 8¼	1 9¼	1 11	2 2½	2 4½	2 4	2 4¾	1 7	27
Pinaster - -	1 0½	1 3	1 5¾	1 6¾	1 8¾	1 11	2 0¼	2 1¾	2 4	1 4	22
Asp - - -	1 0	1 1½	1 2¾	1 3	1 3½	1 4	1 4½	1 4¾	1 5	1 4¼	32
Plane - -	0 10	0 11		1 1¼	1 2¼	1 4½	1 6½	1 7½	1 9½	1 4	34½
Ash - - -	1 0	1 2		1 3½	1 3¾		1 4½	1 5	1 5½	0 10½	32
Asp - - -	1 1¼	1 3	1 3¾	1 4¼	1 4½		1 5¼	1 6¼	1 6¾	0 11½	30
Birch - -	0 11	0 11¾	1 1	1 1½	1 1½		1 3	1 3¾	1 4	1 0	26
Beech - -	0 8½	0 9¼	0 9½	0 10½	0 10¾		1 0¾	1 1½	1 2½	0 9	20
Spruce - -	0 7¾	0 9	0 10¼	0 10¼	0 10½		1 0	1 0½	1 0½	9 0	24
Spanish Chesnut	0 10	0 10½	0 11¾	1 1¼	1 2	1 3½	1 4¼	1 5½	1 6½	1 0	25
Plane - -	0 8½	10 0	0 11¼	1 0½	1 1½	1 3½	1 5¾	1 6¾	1 8½	1 2	29
Pine - - -	0 7	0 7¾	0 8½	0 9	0 9¾		0 11	1 0	1 0½	8 0	24
Asp - - -	1 3½	1 5¼	1 6¾	1 7¼	1 8	1 9¾	1 10½	1 11¼	2 0½	1 4½	39
Larch - - -	0 11½	1 1¼	1 3	1 3¾	1 5¾	1 7¼	1 8¼	1 9½	1 9½	1 4	34
———	1 0	1 2¼	1 3¾	1 4½	1 5¾	1 6¼	1 7	1 7¾	1 9½	1 3	27
———	1 1	1 2½	1 4	1 4¾			1 7	1 7½	1 8½	1 0	27
———	1 2	1 4½	1 5¾	1 6¾	1 7¾	1 9¾	2 0	2 1	2 2½	1 5½	30
———	1 1	1 2½	1 4	1 4¾	1 5½	1 7½	1 8	1 9	1 9½	1 2½	28
———			1 3	1 3½	1 5¼		1 9¼	1 11	1 11½	1 0	26
———						1 6¾	1 8½	1 9½	1 10¼	1 3	31

The

The foregoing is a table of actual admeasurements made of trees as fairly as possible, selected as specimens of the average growth of their respective sorts, composing a plantation of four acres made in the year 1798, on a soil, and under circumstances of peculiar difficulty. The experiment was intended to decide what sort of tree would best suit the soil on which the trees were planted, and their relative and progressive, or periodical, growth. The result will be found to confirm the accuracy of Mr. Waistell's ingenious tables in a former volume of the Society's transactions, excepting that the average growth in height considerably exceeds his statement, and, as far as this instance goes, increases the expectation of a still more satisfactory return of profit to the planter.

SIR,

I FIND Mr. Galton of Duddeston, (to whom I am much indebted for this mark of his regard), has done me the honor to communicate to you some particulars of admeasurements of young timber trees which I sent him last winter. I have endeavoured, by my answers to your queries on the subject, to elucidate the hasty sketch I sent Mr. Galton. My object, in making and keeping the register, was to ascertain the comparative growth of different trees on the same soil, as well as their respective growth at different periods; and I made, as far as I could judge at the time, a fair selection in proportion to the numbers of each sort planted for that purpose; certainly my success in this instance has been to the astonishment and admiration of every beholder acquainted with all the circumstances attendant

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tendant on the experiment; and when I say that planting is with me a favorite pursuit, which, in the season, occupies most pleasantly and healthfully not only my head, but my hands; I need scarcely add, that my gratification has been very great, though, I must confess, capable of increase by any notice which may be taken of my humble endeavours by your most respectable and truly patriotic Society. As I have been restrained from planting on a large scale on my estate here, by the productiveness of the soil, in articles of animal food, I was deterred from offering myself to the notice of your Society, by the consideration of the comparative insignificance of my attempts with many of those splendid undertakings recorded in the volumes of the Society; hoping also, at a period not very distant, from the result of my experience, now in a state of progress, on a much larger scale, on my property in Monmouthshire, to have it in my power to offer some important facts and conclusions deserving of that notice which Mr. Galton has so unexpectedly directed to my efforts here. Any further information in my power to give, it will be my pride and pleasure to furnish, knowing of no gratification superior to that of the advancement of the peaceful and beneficial arts of civilized life.

I am, Sir,

Your obedient and humble Servant,

JOHN H. MOGGRIDGE.

The Boyce, near Gloucester, June 30, 1810.

To C. Taylor, M. D. Sec.

Answer

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Answer to Dr. Taylor's Queries on the subject of the Growth of Timber in my Plantation.

1st.—In the table I had the pleasure to draw out for Mr. Galton, the first nine columns contain the circumference of trees taken in feet, inches, and quarters, in the months and days mentioned at the tops of the columns, and in the years also there marked. These admeasurements were taken at three feet from the ground.

2d.—The last column contains the height of the same trees, (to the beginning of that year's shoot), when measured in October 1809. The figures in the next preceding column register the mean circumference of each of the said trees, and this was obtained, (the whole height being first ascertained), by measuring the circumference at one half the height. This column I added, in order that any person who chose might, in the table, possess all the requisite means of calculating the actual content of each tree; and then, by the aid of Mr. Waistell's rules, the accuracy of which for every *safe* and practicable purpose I have, from careful comparison of facts, no doubt of), also calculate what the contents would be at any future period.

3d.—The soil on which the trees in question were planted, appeared to be of the most unpromising kind. In forming a canal through my grounds about four acres, (the scite of this plantation), were covered with the subsoil excavated from excessive deep cutting in the approach to the mouth of a long tunnel. The substance raised in irregular heaps, some not less than twenty feet above the natural surface, consisting chiefly of a sort of

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of argilacious marle, containing by analysis, very small proportions of calcareous matter, and silex combined with argil, the stubbornness and infertility of this soil, after the lapse and exposure of several years, occasioned it still to remain nearly as at first, combined in hard and stubborn lumps, and was as bare as ever of any vegetable production either of grass or weeds. My first intention was to reduce the heaps into some comely shape, and clothe them with herbage; but I found the attempt so expensive, chiefly from the circumstance of this substance not permitting the free use of the spade, but mostly requiring to be first loosened by the mattock, that after levelling about half an acre, I desisted; and in the year 1798, resolved to plant about an acre by way of experiment, having no analogy to reason from, and uncertain what, or if any trees would grow, I planted most of the sorts of well known forest trees. My method was to stock, and then throw out the soil from a hole or pit about two feet diameter and one foot deep. From heaps of native soil carted from the adjoining field, I deposited to the depth of two inches in the bottom of the hole, on which the plant being placed, the roots were bedded in about half a wheel-barrow full of the same earth, the surface of the hole being finally left two inches below the general surface of the plantation. The plants were set out nearly one yard a-part. The scite of the plantation was a long, narrow, undulating stripe of ground, of different widths, and running in length, with some little variation, north and south. The canal, from fifteen to thirty feet below the surface of the plantation, formed a sufficient defence to the east, on the west, and on the two ends, north and south. I have raised (planted with similar care) a good

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a good hawthorn fence, defended from the first by post and single rail upon the bank, with an additional guard of thorns stuck into the bank for the first two years. The trees were mostly of the height of from two feet to four feet when planted, their age I can only guess at, having at that time (this being my first essay in planting) no other means of procuring them than from the public nurseryman. The trees were mostly planted in the spring of 1798: a very few had been inserted in the November preceding. I made no preparation of the ground previous to planting whatever, having but little hope of success myself, and this hope being at times reduced to despair by the unanimously unfavourable opinion of the country: after the planting was done, I scattered at the rate of six cart loads per acre of native earth over the surface; and the following spring had it hacked over with heavy hoes, and turnip-seed raked in, the produce (chiefly of the size of marbles) being in due time hacked in also, and this mode was repeated the second and third years.

4th—I have it in my power to communicate the admeasurements of size this Midsummer in addition to those I sent Mr. Galton last winter, and they are below stated. It was my intention always to have measured the trees before the spring shoot; and after its completion, before the commencement of the summer shoot; but as, for the sake of accuracy, I have always taken the admeasurement myself, so a variety of engagements have prevented my adhering to times and seasons therewith as I wished. The distances in October last did not average five feet. In my judgment the trees should have been set out at greater distances; but this plantation having become extremely ornamental, and walks having been led through it, I sacrificed a little on this point of the useful to the beautiful; from the

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the same cause I have not suffered the trees to be pruned so closely as I think right, and as I have done in other plantations: I have thinned out the plantation as it appeared to require it, but have kept no particular account of the number or value. At nine years I began, and for rails and posts of fences of single trees, many of the trees cut out were serviceable. In three years more I expect the thinning will be valuable. I should perhaps add, that the third, fourth, and fifth years after planting, where the trees, which had in general languished dreadfully, seemed to be reconciled to their situation, I drew out a considerable number of good and valuable plants for use in other plantations. The admeasurements of height have been but once taken; it is meant to continue this annually

5th—It is the pinaster which is recorded in the table.

6th—The value of the land at the time of planting may be sufficiently inferred from my answer to the third query; certainly it was not then worth five shillings per acre. The experiment on the first planted portion of the four acres having succeeded, I need scarcely say, that as soon as I felt myself justified thereby, I proceeded to plant the remainder, and it now forms, *on the whole*, as handsome and flourishing a plantation as is to be met with any where.

J. H. MOGGRIDGE.

Addition

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Addition to my former Table from admeasurements made 25th June 1810, *continued in the same order, taken also at three feet height.*

	Feet	Inch.	
Larch - - -	2	6	
Pinaster - -	2	4½	
Asp - - - -	1	5¾	
Plane - - -	1	10	
Ash - - - -	1	6	
Asp - - - -	1	7½	
Birch - - -	1	4½	
Beech - - -	1	3	
Spruce - - -	1	0½	
Spanish Chesnut	1	6¾	There being no apparent increase in the size of these trees, I think it may be accounted for from the circumstances of the measuring place having been the year before at a swell occasioned by branches now removed.
Plane - - -	1	9½	
Pine - - - -	1	1	
Asp - - - -	2	1	
Larch - - -	1	11½	
———	1	11½	
———	1	8¾	
———	2	3½	
———	1	10½	
———	1	11¾	
———	1	11½	

J. H. MOGGRIDGE.

To C. Taylor, M. D. Sec.

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The LESSER GOLD MEDAL *of the Society was this Session voted to* J. C. CURWEN, Esq. M. P. *Workington-Hall, Cumberland, for his Method of feeding Milch Cows with steamed Food.*

A SILVER MEDAL *had been presented to him in the Year* 1803, *for his Experiment on feeding Cattle with steamed Potatoes, and in the Society's* 21*st Volume a full description, with two Copper-plate Engravings of his method of applying the Steam, are inserted.*

The Apparatus therein described is in many Respects so similar to the present, that the annexed Wood Engraving will sufficiently explain any difficulty that might arise upon the subject.

Drawings from Mr. CURWEN *upon a larger and regular Scale are preserved in the Society's Repository.*

DEAR SIR,

YOUR esteemed favor, enquiring how I am employed, seems a hint that I am supposed to be idle, or that my ambition is become extinct; I can assure you, neither the one nor the other is the case. After the kind and liberal manner in which I have been treated by the Society of Arts, &c., I should be sorry to interfere, by competition, with those who are beginning their career; at the same time, for any matter which I conceived might be beneficial to Agriculture, there is no channel, in my opinion,

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opinion, through which it could be brought before the Public, with the same chance of being favourably received, as under the auspices of a Society, which has rendered such great and important services to the empire.

In the prosecution of the system I have practised for some years, of giving cooked food to all animals, the main impediment has been the cost of labour and fuel; to lessen the one, and simplify the other, have been my constant endeavour; in this at length I conceive I have been completely successful; and that I have thereby removed those obstacles, which were opposed to its becoming generally, and I should say, universally useful. Under this conviction, I beg leave to submit to the inspection and consideration of the Society, a drawing of one of the steamers, containing 100 gallons, as now used at the Schoose farm.

Each of the two steamers which I use has three boxes, containing eleven stone each of chaff, (the husks of corn,) which in boiling gains somewhat more than two-thirds of its original weight. Wheat chaff, which alone I use, is commonly thrown upon the dunghill, as of no value but to augment the quantity of manure. It requires three hours to be sufficiently boiled. The same boiler works two sets of boxes; by the various stop-cocks the steam can be made to work either one, two, or all three boxes of each set.

The usual consumption of fuel is two pounds per stone. I estimate the quantity done every day at the Schoose to be equal to one hundred stone, or thirty-three of chaff, which takes sixty-six pounds of coal. As the expense of coal is not great here, I should not suspect much economy is practised; even at the price of coals in London this would not be above sixteen shillings per week. Two

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pounds of oil cake are allowed to each stone of chaff. The milch cows and oxen are fed twice, morning and evening, having an allowance of one stone at each time. When taken from the steamer, the food is put into wooden boxes, which are mounted upon wheels to be drawn by a horse. As the chaff and liquor require to stand some time to cool before fit for use, there must be several of these boxes to put the chaff in when taken from the steaming boxes.

The cost of food for each milch cow per day.

	d.
Chaff, two stone, steaming, &c. .	1
Oil cake, four pounds, . .	4
Eight stone of turnips, 14 lb. per stone .	4
Wheat straw, . . .	1
Total	10

The average of milk on a stock of thirty-six milch cows, was nearly thirteen wine quarts for three hundred and twenty days; one hundred and forty-two thousand quarts were sold in fifty-two weeks, ending the 20th of September last, selling price 2*d.* per wine quart. The calves brought from 2*l.* to 5*l.* each for rearing. The produce is nearly half clear profit, estimating the manure as equal to the labour. The milch cows are never suffered to be turned out. To prevent their being lame, some attention is requisite to have their hoofs properly pared, and that they stand with their fore feet on clay.

The condition, health, and milking of the cows, fed upon this plan at the Schoose, has created a considerable interest, aud called forth particular attention from numerous visitors. The contrast between the condition and milk

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milk given by these cows and those fed on grains, as most if not all are in and about the metropolis, seems an object well deserving attention.

Most, if not all, the milch cows at the Schoose are in such a condition, that a few weeks feeding after they are dry, makes them fit for the shambles, with very little loss from the first cost.

Compare this with the state of a London dairy;—what may be the average loss by deaths I know not, but when done milking, their value for fattening is very little; they are so low in condition. As a substitute for chaff and oil cake, I should recommend cut hay, this steamed would make a much superior food; and I entertain no doubt, would greatly augment the milk, as well as benefit the health and condition of the cows.

It has struck me, that the sugar wash might be found of great service for boiling the hay.

As I have never seen an instance when cooked food has not produced a striking improvement in the condition of cattle, I am strongly prepossessed in its favour. My representations have had their effect with one gentleman, Mr. Isaac Franklyn, who has a dairy farm at Oxgate, on the Edgware Road, 4½ miles from Paddington turnpike; and who lately had a dairy in Henrietta Street, Cavendish Square. An apparatus made here, is on its way for him.

In order more fully to satisfy the Society that this statement does not rest on a prejudice, natural to every projector of any plan, I beg to refer to Mr. Tubbs, who, on seeing the dairy at the Schoose this summer, was so struck with the condition of the cattle, that he promised to use his influence with Mr. Welling, to attend the meeting in September. Nor shall I rest on the respectable authority of Mr. Tubbs only; but refer also to Sir George

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Paul, Bart., who will recollect, that before he saw the milch cows, I observed to him, that if the condition of the whole stock did not surpass any he had ever seen, I was ready to admit my system had failed. I need scarcely observe, that the strictest attention is necessary to see the cows always kept clean, and never to suffer the least heat to appear upon their skins, without an immediate application of black soap and water. They are also regularly carded or curried, and care taken in keeping them in a regular degree of temperature. Any considerable change affects their milking. I give cooked food from October to June, nearly eight months out of the twelve.

No branch of farming is so profitable as the dairy, when properly and well managed. By the mode I propose, I flatter myself there would not only be a great saving in expense of feeding, but also in the depreciation and loss sustained on the capital, with an augmentation in the quantity and quality of the milk; I find that twelve wine quarts of the Schoose milk, will give from sixteen to eighteen ounces of butter, which is little inferior to what can be got at the height of the grass. Much, in my humble opinion, is to be gained both by the individual and public.

Milk in London, from its present price, must be considered as a luxury. Reduce the expense of procuring it, lower the price, and more than double the quantity might be sold, with the greatest benefit and comfort to the bulk of the community. This object is attainable, leaving a handsome and liberal profit to the cow-keeper, and I verily believe would be effected by the system I propose.

The plan I have now the honour of submitting to the Society has been adopted by Mr. Harley, of Glasgow; by Major Ferrand, and the Reverend J. Penny, in the West Riding

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Riding of Yorkshire, and many others; and in every instance it has been found most completely to answer.

With great respect,

I have the honour to be,

Dear Sir,

Your obedient humble servant,

J. C. CURWEN.

Workington Hall, Nov. 14, 1811.

To CHARLES TAYLOR, M. D. SEC.

MY DEAR SIR,

YOUR letter roused me into action; I cannot suffer you to suppose I can slacken in my exertions. Though great and important improvements have been made in Agriculture in the last few years, it is far distant from perfection even in the most improved districts. The comfort and happiness of the many has always held out to me the strongest incentive for exertion, and no part of my farming operations have yielded me equal gratification as my dairy. The result of what was done at the Schoose last year has confirmed my opinion that a plentiful supply of good and unadulterated milk is of the highest importance to the comfort and health of the lower orders; 145,000 quarts of new milk were sold in the last twelve months—Milk is now become a necessary of life—Five years ago the amount of the total sale to the town of Workington, containing between eight and nine thousand souls, might be £1,500 per annum, or at twopence per quart, wine measure, 108,000

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quarts—From the best information I can obtain, I conceive I am warranted in stating the present sale of milk to be above £. 5,000 per annum, or 600,000 quarts. Thus the proportion to each individual in the year 1806, would be 20 quarts, in the year 1811, 60 quarts. The truth is, that it was but in partial use. Now, Sir, I believe I may assume, that what was the situation of Workington a few years ago, is that of the greater part of the kingdom at present. That species of human food which is produced in the greatest abundance with the least consumption of the fruits of the earth, is a luxury, and not as it ought to be, one of the staple articles of consumption. Impressed with these sentiments, you will not wonder if I answer your enquiry respecting what I am about with no small degree of satisfaction, as it offers to me a prospect of extending a favourite object, and one that I have sincerely at heart. The time and attention I have bestowed on this subject, have given it an importance in my view, that may surprise those who have only considered it superficially. I am disposed to believe much national benefit, as well as national happiness, might be obtained by directing the attention of the farmer to this branch of Agriculture, which is but ill-understood. You will pardon me when I say, that even the dairies in and near the metropolis, are under most defective management.—Now, my dear Sir, your Society stands most deservedly high in public estimation. From long experience I know how warmly the Society is disposed to patronize every object which can tend to benefit the public.—According to the usual rate at which improvements travel, and get into general practice, it will require many years to introduce animal cookery. If I can have the good fortune to convince the Society, of the advantages resulting from giving to milch cows and other stock, a portion of warm food,

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food, will they give me their sanction, and stamp the sanction of their influence upon the system? It proposes several objects. Of one I have no doubt, a great increase of milk of a much better quality. I think in many situations it must contribute to reduce the price at which it is at present sold; when a dairy is properly attended to, two-thirds of the cows now kept would give a larger quantity of milk. That instead of there being a most serious loss in the condition of the stock when their milk failed them, they would be very nearly in a state fit for the butcher. The loss of capital to the cow-keepers, is a very serious drawback from the profits of the business; and were this the only object it would be well deserving of attention.

What I should propose would be, that the Society should hold out some encouragement to induce the cow-keepers to visit the Schoose farm. If the statement I have made be found erroneous, the expenses of the persons who may be induced to undertake so long a journey, shall be at my charge. All my anxiety would be, that they should bestow the time necessary fully to comprehend the plan. If the testimony of thousands who have seen the Schoose warrants confidence, I may assume it: nor is that the only ground; it has been also tried at Glasgow; and in various parts of the West-Riding of Yorkshire, with the most complete success. The price of grain renders the stoppage of the distilleries absolutely necessary; this will deprive the cow-keepers of a considerable portion of food for their cattle. In order to prove to them what might be expected from steamed hay, I am trying four pounds of clover hay, boiled with chaff, instead of two pounds of oil-cake; I am sanguine it will answer. The milch cows drink the liquor in which it is boiled with great avidity. When hay could be afforded in greater quantities, any proportion of liquid might

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might be had; by steaming, two thirds is added to the weight. I have, in various instances, in the course of the last twelve months, sold to the butcher, at or very near prime cost, cows that were giving from three to four quarts of milk at the two meals. The cost of keep being estimated at ten-pence per day, when the quantity does not exceed five quarts there is no profit, and the getting rid of them is an object.

The amount of milk sold in the Metropolis is calculated to be £. 1,250,000 annually, or 60,000,000 of quarts, this, supposing 1,000,000 of inhabitants, allows sixty quarts to each individual, equal to what is consumed per head in the town of Workington. But it will occur to those who have any acquaintance with the metropolis, that milk is consumed only as a luxury; and is not in use with the lower classes; indeed it is in inverse ratio; and, instead of being the cheapest, is the dearest food. Supposing the produce of a milch cow, fed with grains, &c. to be ten quarts per day, for 320 days, or 3,200 quarts, it would require 18,750 cows, to give the quantity of milk sold; a pretty strong proof of the adulteration which takes place, as I do not suppose there is near that number kept.

The cost of feeding on steamed hay, I should suppose to be nearly as follows:

	s.	d.
One and a half stone of hay, at 6 *l.* per ton -	1	0
One stone dry do. 14 lb. to the stone - -	0	8
Steaming, labour, &c. - - - - - -	0	4
	2	0

If I recollect right, 2*s.* 6*d.* per day, was Mr. Welling's estimate

estimate of the cost of feeding milch cows some years ago.

From what experience I have had at the Schoose I estimate the produce of each milch cow at twelve quarts per day; this would add 12,000,000 of quarts, on the number of cows supposed to be kept,—say,

	£.
12,000,000 of quarts at 4 *d.* - - -	200,000
Suppose only a saving of £. 2 per head, in the number of cows, from superior health and condition - - - - -	36,000
	236,000

I believe I should be warranted in stating the actual loss of the dairy men, at £. 5 per head on his stock, in the neighbourhood of London, by their present mode of management.

Suppose my estimate correct of 18,750 milch cows, valuing them at £. 28, one with another, would amount to £. 337,500.

If I have succeeded in my endeavours to impress upon the Society the magnitude and importance of the object, I shall feel I have done some service.

I have the honor to be, with great respect,

Dear Sir,

Your obedient and humble Servant,

J. C. CURWEN.

Workington-Hall, Nov. 15th, 1811.

To C. Taylor, M. D. Sec.

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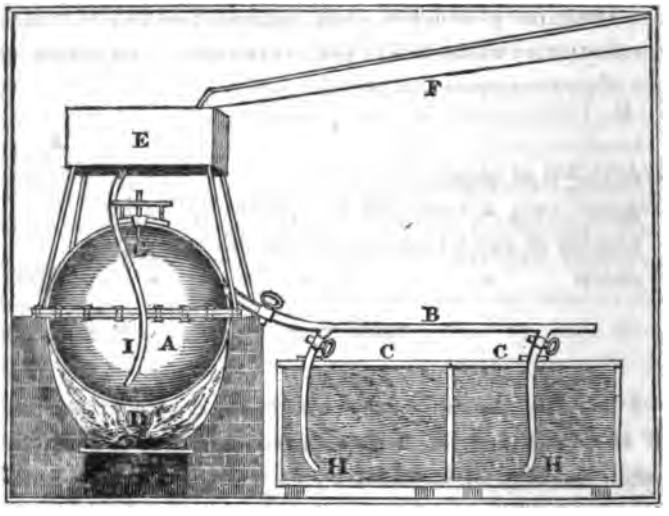
Mr. Curwen's *Apparatus for Steaming Food for Cattle.*



Reference to the Wood Engraving.

A Represents a section of the iron steam vessel in which the water is to be boiled.

B The main steam pipe to convey the steam from the boiler to the strong square wooden boxes C C, containing the chaff or hay to be steamed, at the bottom of which a small quantity of water is previously placed.

D The fire-place and ash-hole under the steam vessel.

E The water-back which supplies the boiler with water, by means of the spout F, from a pump communicating therewith.

G The safety valve of the steam vessel.

H H The lead pipes which convey the steam from the main

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main steam pipe, to nearly the bottom of the wooden boxes containing the chaff or hay; these pipes have cocks above.

I. The pipe by which the cold water is introduced from the water-back into the lower part of the boiler.

N. B. The capacity of Mr. CURWEN's Steamer is one-hundred gallons, and steams at the same time three boxes, each containing eleven stone of chaff: he has three boxes on each side of his steamer, so that one set may be steaming, whilst the others are emptying.

DEAR SIR,

I FEEL it a duty incumbent on me, as it may benefit the public at large, and likewise as a tribute of grateful respect to my honored friend Mr. Curwen, who first recommended to me the use of steamed food for my cattle, to inform you, that I have made a long and decisive trial thereof, and have found it to answer, both in respect to the carcase and milk of my cows. They daily increase in quantity, and the quality of the milk is far superior to any I ever saw.

I give steamed food once a day to my horses, namely, in the evening when they have done work, and I find it to answer much better than dry food.

I was accustomed to feed my cows with grains, hay, and green food, but since I have given them the boiled hay, they have not had any grains nor green meat, and I find the cost of their keep to be less than when I fed them with grains. In short I feel myself so well convinced of the advantages resulting from the use of warm food,

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food, that I do not intend ever again to have recourse to grains.

The liquor or decoction from the hay, which is taken from the bottom of the steam boxes, is greadily drank by the cows before they begin to eat the hay.

I am,

Dear Sir,

Your most obedient servant,

ISAAC FRANKLYN.

Oxgate Farm, Edgware Road,
Wellsdon, Middlesex, March 16, 1812.

To C. Taylor, M.D. Sec.

Estimates of the difference in Expense of Feeding Twenty-eight Milch Cows on Grains, &c. and on Steamed Food, each Method tried for one Week.

Feeding with Grains, &c.

	£.	s.	d.
Thirty quarters of grains of eight bushels each, at 4*s.* - - - -	6	0	0
Cartage, &c. - - - -	2	10	0
Seventy trusses of rowen, or second crop of hay, at 2*s.* 3*d.*, each truss weighing 4 stones or 56 lbs. - - -	7	15	6
£.	16	5	6

The above is, within a fraction, 1*s.* 8*d.* per cow, per day.

Feeding

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Feeding with Steamed Hay and Rowen.

	£.	s.	d.
Hay steamed, forty-two trusses, at 3*s.* 1*d.*	6	9	6
Mens' wages, chaff, cutting and steaming	0	15	0
Expenses of fire - - -	0	7	0
Seventy trusses of rowen, at 2*s.* 3*d.*	7	15	6
£.	15	7	0

This is, within a fraction, 1*s.* 6¾*d.* per cow, per day.

The balance, in favor of the steamed hay, is 18*s.* 6*d.* per week, besides the better condition and value of the carcases of my cattle, the great increase of milk, and superiority of its quality. I deduct three-pence per truss from the present average price of the hay used in steaming, on account of the cartage and market expenses which are saved by its being consumed at home. I put 1*d.* per day for fire, though I do not believe it costs me any thing, as the water from the steam boiler serves to clean the milk utensils, for which the firing used to cost me as much; besides which, I apply the steam to many culinary purposes, having a pipe communicating from my steamer to my kitchen.

ISAAC FRANKLYN.

DEAR

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DEAR SIR,

WHILE I acknowledge with pride and gratitude, the honour conferred on me by the Society, it will be some satisfaction to them to know, that I have had various applications from different parts of the kingdom, for further details as to the plan for which I have been honoured with the Society's Gold Medal. I hear with peculiar pleasure that a number of the steamers have been ordered, and that the patronage of the Society is likely to give great extension to my system. I am gratified at all times to afford any information in my power; but I do not wish any one to rest on my statement, and I have uniformly thus declared, 'Visit the Schoose, judge with your own eyes, and if not satisfied I will repay you the expense of your journey.' Mr. Franklyn I hear is succeeding most admirably, I think he is entitled to great praise, and I shall be proud to bestow upon him, at my first meeting, a premium cup, for his having so promptly seconded an object I have so much at heart.

I am,

Dear Sir,

Your humble servant,

J. C. CURWEN.

Belle Isle, Windermere,
July 3, 1812.

To C. TAYLOR, M. D. SEC.

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The SILVER MEDAL *of the Society was this Session voted to* C. T. SKURRAY, *Esq. of Alverdiscot, near Barnstaple, for his culture of Summer Wheat, or Blê Tremois. The following Communications on the Subject were received from him, and Samples of the Wheat are in the possession of the Society.*

SIR,

AT the present high price and scarcity of bread corn throughout the kingdom, any attempt, however unsuccessful, to remedy these evils, will, no doubt, be considered of national importance; impressed with this idea, I beg leave to present to your Society, which professes the Encouragement of Agricultural Improvements, a specimen of the real Summer Wheat, (Triticum Æstivum) or Blê Tremois of the French, which I have grown with great success, for some years, at my farm in Devonshire. In a season like the last, had it been generally known and cultivated, we should now have but little cause to dread a famine, or depend on our enemies for the bread we eat. As the merits of this grain have been clearly ascertained and pointed out by that eminent botanist, Sir Joseph Banks, and many others, any thing which I can say in its favour, is therefore unnecessary; but as few practical farmers have leisure to read the voluminous writings on this subject, I will, if your Society should think it worthy of their notice, send you a brief account of my method of cultivating it.

For some years it has produced me *double per acre* the quantity of the common wheat; and this last season I fortunately sowed twenty acres, which were very productive, and a good sample, although forty acres of my Winter

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Wheat, nearly adjoining, were so blighted, or mildewed, as hardly to pay the wages of harvesting and thrashing. Two acres of my Summer Wheat produced sixty-one bushels, which would have sold at 16*s.* per bushel, for bread; but having a demand for it for seed, it produced 20*s.*, or 61*l.*, besides the value of the straw. The common wheat, growing in the same field, was much blighted, and produced, from two acres, only eleven bushels, which sold at market for 9*s.*, or 4*l*, 9*s.*: and, in fact, all the common wheat in my neighbourhood is so bad in quality, and deficient in produce, as not to pay the expenses of growing it.

As I have no other object in view but to make known the merits of this valuable grain, I shall send you a small quantity as a specimen, which you will observe is in its *rough state*, as it was thrashed from the straw: of course, if skreened, the sample would be superior; and should your laudable Society express a wish that I should communicate to you the method I have adopted in growing it on my farm, if you will favour me with a letter to that effect, I shall have much satisfaction in forwarding such a communication as soon as possible. It is proper to observe, that there are many varieties of what are called Spring Wheat, some of which are grown extensively in the North of Europe; but the variety I cultivate came originally from Jersey; it is a bearded wheat, and superior to any of the Spring Wheat hitherto known.

I have the honour to be,
Sir,
Your most obedient humble servant,
CHARLES THOMAS SKURRAY.
Secretary to the North Devon Agricultural Society.

Alverdiscot, near Barnstaple,
March 24, 1812.

To C. Taylor, M. D. Sec. SIR,

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SIR,

I SEND herewith, a specimen of my Summer Wheat, in its rough unskreened state, and beg to observe, that it grew on a field of about eight acres; six acres of which were sown with common wheat, at Michaelmas, 1810; and the other two acres were sown the 20th April, 1811, with the Summer Wheat, the six acres were so much injured by the blight or mildew, as to be hardly worth the expense of harvesting; whilst the Summer Wheat was perfectly free from mildew or blight, and produced upwards of thirty bushels per acre. I have cultivated it for some years, and feel convinced, that if this variety of Summer Wheat was universally known among our practical farmers, the country might be rendered independent of foreign nations for a supply of bread corn, the importance of which is evident. I shall with much pleasure present your Society with a brief account of my mode of cultivating it, if they deem it worthy of notice; and I shall feel the highest satisfaction if my humble endeavours to introduce its cultivation to general practice should prove successful.

I have the honour to be,

Sir,

Your most obedient humble servant,

CHARLES THOMAS SKURRAY.

Alverdiscot, near Barnstaple,
March 29, 1812.

To C. TAYLOR, M.D. SEC.

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SIR,

I BEG leave to state briefly, some important considerations in favor of Summer Wheat. Viz.

1st. It may be sown with success so late as the 1st of May.

2dly. It requires no extra culture beyond other spring corn.

3dly. It is a better nurse to clovers, and grasses, than barley or oats.

4thly. It contains more nourishment than common wheat.

5thly. It yields (in soils unfit for winter wheat) a large increase.

6thly. The straw is excellent fodder for cattle, and superior to barley straw.

The above facts can be testified by many gentlemen and practical farmers in the north of Devon; but there are other material points to which I beg leave to call the attention of your Society.

The great sums paid to foreign nations for a supply of bread corn, to support our population, might, by the cultivation of Spring Wheat, instead of barley, be wholly saved to the country; the use of sugar in our distilleries might then be permitted, without detriment to the agricultural interests of Great-Britain; and those sacrifices which our landed proprietors are called upon to make for the support of our West India colonies, would be unnecessary.

Mr. Coke, of Holkham, when he addressed the House of Commons on the Distillery Bill which passed recently,

very

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very justly observed, that the soil, and other circumstances, in various parts of the kingdom, were unfavourable to the culture of oats; and that the farmers were *obliged to grow barley* after turnips, which formed a great link in the Norfolk rotation. As Summer Wheat is known to succeed admirably after turnips, why should it not be cultivated in preference? There can be, in my opinion, no other cause, than is occasioned by the difficulty of procuring the genuine seed of the true Summer Wheat; for although there are upwards of forty varieties of this species, some are so inferior as to give little profit to the growers, which has unjustly got the whole species into disrepute with them. I beg to be understood, that I do not by any means advise the culture of summer wheat in situations which are favorable to the winter wheat, unless by accident the young wheat should be destroyed, in which case I strongly recommend it as a certain means to avoid a dearth of bread corn, nor do I intrude it on your notice as a new discovery, it having been known on the Continent of Europe for centuries; but however unaccountable it may appear, it is a grain that is but little known in most parts of this kingdom, among our practical farmers, on whom the country depend for subsistence. I do not hesitate to say, that if this grain had been generally cultivated last spring, bread corn would, at this moment, have been plentiful and cheap, the reverse of which is now well known. This grain is not subject to any distempers, nor does the blight affect it like common wheat; which alone, independent of every other consideration, is a sufficient inducement for me to recommend it. Its merits are well understood by the farmers in my neighbourhood, who have very wisely reserved their whole

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crop for seed, by which means a plentiful supply may be obtained another season. Owing to its present scarcity, the farmers are buying it at Barnstaple market, at one guinea per bushel.

I shall begin sowing fifty acres of it next week, and have no other object in poining out its merits, but to see it brought into general cultivation, a matter (in my humble opinion) of great national importance.

I have the honour to be,

Sir,

Your most obedient humble servant,

CHARLES THOMAS SKURRAY.

Alverdiscot, near Barnstaple,
April 3, 1812.

To C. Taylor, M. D. Sec.

DEAR SIR,

All the information I am possessed of respecting Spring Wheat, has been acquired by my own experience, and that of the principal farmers around me, with whom, from its peculiar merits, it has become an ordinary crop of late years. I have found it thrive on various soils, but a loam, inclining to stiffness, certainly suits it best; a light soil, however, if after turnips eaten off by sheep, will produce a good crop; and in this neighbourhood it is usually

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usually sown broadcast from the beginning of April to the first week in May. The common practice here is to sow it after a green crop, and if the land is in heart, it requires no manure; it ripens with us about the same time as the common winter wheat; is not subject to the mildew, or rust; and, as the straw is slender, I always mow it with a scythe; by which means it is speedily harvested, and at a trifling expense. The usual crop of *common wheat* in this part of the country, is, on an average, fifteen bushels per acre; but the same fields which produce fifteen bushels of winter wheat, generally yield twenty-five bushels of Summer Wheat; and, in some cases, much more. The farm I occupy consists of nearly four hundred acres, of various descriptions of soil; on which, for three years past, owing to bad seasons, my common wheat has not averaged twelve bushels per acre, of a very inferior sample; whilst the summer wheat produced about twenty bushels per acre, of a good quality; and, in *one instance*, it yielded above thirty bushels per acre. The weight, in 1810, of a Winchester bushel, was rather more than 60 lbs; but last year, not above 58 lbs. It sells in our markets for the same price as good red lammas wheat, and is eagerly bought by our millers.

Last year my crop of wheat consisted of forty-five acres of winter, and twenty of Summer Wheat; the winter corn was blighted so much as to be almost unfit for use, and the produce only six bushels per acre; the Summer Wheat, though growing partly in the same field with the other, was wholly free from blight, and yielded, from one acre, which was thrashed separately, thirty-one bushels, of the same quality as that which I had the honor of presenting, as a specimen, to your Society.

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The grass seeds, sown with it, thrive admirably, as it is less likely to lodge in bad weather than other spring corn.

I have the honour to be,

Sir,

Your most obedient humble servant,

CHARLES THOMAS SKURRAY.

Alverdiscot, near Barnstaple,
April 17, 1812.

To C. Taylor, M. D. Sec.

In 1809, I made the following experiment with the Summer Wheat.

About the 4th of May I sowed part of a field of nine acres with barley, and the other part with Summer Wheat, the land was poor, and not well worked.

	£.	s.	d.
The barley produced seventeen bushels per acre, which I sold for 4*s.* 9*d.* per bushel, and it produced me, per acre - -	4	0	9
The summer wheat yielded twenty-one bushels, of a good sample, and sold for 14*s.* per bushel, or per acre - - -	14	14	0
Superiority in favor of the Summer Wheat, per acre - - - - £.	10	13	3

In 1811, I sowed a field with barley the beginning of May, except one acre, which being wet ground and poor, was

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was sown with Summer Wheat, for experiment; the barley produced not quite twenty bushels per acre, which sold, in December last, for 6*s.* 6*d.* per bushel; and the acre of Summer Wheat produced thirty bushels and two pecks, which sold for 20*s.* per bushel, a few weeks ago.

	£.	s.	d.
Produce of the barley, per acre, say -	6	10	0
Do. of the summer wheat - -	30	10	0
Balance in favor of the wheat, per acre £.	24	0	0

The same year, in a field of eight acres, seven acres were in common wheat, and about the end of April I sowed the other acre with the Summer Wheat, the winter wheat was struck with rust, so as to be hardly worth harvesting, but the uSmmer Wheat produced thirty bushels, from the one acre, the sample similar to that your Society did me the honor to accept.

Certificates.

No. I.

This is to certify, that I have grown the Summer Wheat for three years with great success, and intend to cultivate it on a much larger scale this season, in consequence of having a more productive crop than the original produce of this county. I also sold it one day this season publicly in the market, to a miller, for 2*s.* per bushel *more* than the *common white wheat;* it weighed 60¾ lbs. per bushel; it produced me twenty-eight Winchesters per acre;

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acre; the common productions of this country wheat yielded nineteen bushels, grown in the same field the last season, and weighed the same.

W. TYETH.

Pill Head, April 21, 1812.

DEAR SIR,

THE above is the certificate of William Tyeth, Esq. of Pill Head House, near Biddeford, a gentleman who possesses a very correct judgment on every subject connected with agriculture, and who farms a considerable estate of his own in the most improved manner.

I am,

Dear Sir,

Yours, &c.

C. T. SKURRAY.

To C. TAYLOR, M.D. SEC.

No. II.

THIS is to certify, that I have cultivated the Summer Wheat for four years, and find the produce superior to the other wheats; I have sown it throughout the month of April, in general after turnips and potatoes; and it is ripe about ten days or a fortnight after the wheat that is sown at

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at Michaelmas. The baker that I have dealt with for upwards of twenty years, has preferred it to the common red wheat; the weight per bushel is about 60 lbs.; I clover the ground at the same time as with other spring crops, which I find to answer extremely well.

LEO. WOOD.

South-Cott, April 22, 1812.

No. III.

THIS is to certify, that I have cultivated the Summer Wheat, and have found it to answer extremely well, particularly this last season, and think it a valuable wheat. I am convinced that I had more bushels per acre of that wheat this season, than I should have had of any other wheat in the same ground. It was totally free from rust, and all my other wheat was *much* rusted, particularly in the adjoining field.

JOHN DENE.

Horwood, April 22, 1812.

SIR,

THE first of these two certificates is from an opulent farmer near Biddeford, Mr. Wood, of South-Cott.

The latter from a respectable clergyman, who is proprietor of a good estate, part of which he farms himself, the Reverend John Dene, Rector of Horwood, in this neighbourhood.

C. T. SKURRAY.

TO C. TAYLOR, M. D. SEC.

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The SILVER MEDAL, *or* TWENTY GUINEAS, *at his option, the Premium offered, Class 26, were this Session adjudged to* JOHN FINCH, *Esq. of Red Heath, near Watford, Herts; for Rearing and having in his present possession, One Hundred and Twenty Three Stocks of Bees. In a handsome manner he preferred the Honorary Reward. The following Communication was received from him.*

SIR,

ON perusing the list of Premiums offered by the Society, I found in article 26, a premium proposed for the greatest number of hives stocked with bees. Having a great number in my possession, I am induced to become a candidate for the premium. I beg leave to inform you, that from a single hive I have with much care and attention increased the number to one hundred and twenty-three, in my possession the last summer.

I have inclosed Certificates to confirm this statement,

I remain,

Sir,

Your obedient servant,

JOHN FINCH.

Red Heath, near Watford, Herts.
Feb. 29, 1812.

To C. TAYLOR, M. D. SEC.

CERTIFICATES

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CERTIFICATES were received from R. H. Solly, Esq. Great Ormond Street, and Mr. John Finch, jun., testifying that on the 18th day of August, 1811; there were one hundred and twenty-three hives stocked with bees, in the garden of Mr. John Finch, of Red Heath.

SIR,

IN answer to your letter, acquainting me that the Society had adjudged to me their Silver Medal, or Twenty Guineas, at my option, I beg leave to observe, that I prefer the Medal of the Society, as a more honorable and permanent mark of the Society's approbation.

I am sorry to say that I cannot give so precise an account of the produce of my bees as I could wish, having taken no regular account thereof, but, to the best of my knowledge, the weight of the last year's honey was 150lb., and the wax 20lb., but as many of them were late casts, their produce of course must be small.

It is impossible to state the average quantity produced yearly, as it entirely depends on the swarm.

I have the sole management of my bees, and my constant attention is requisite during the swarming season, as wherever the Queen Bee goes, the rest of the swarm are sure to follow.

My method of treating the swarm is, to take off the bough on which they may happen to settle, and shake them off into a hive prepared for them.

It is particularly requisite to keep them covered up during the winter, and likewise to secure them from vermin

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vermin and birds, such as Tom-tits and Mice, which often make great havock amongst them.

Having great convenience in my garden, I have been induced to try different ways of placing them out; and certainly find them to succeed much better when rather shaded by shrubs, than when placed close together and fully exposed to the sun; as the strong hives are very apt to rob those which are weak.

I remain,

Sir,

Your's most respectfully,

JOHN FINCH.

Red Heath, near Watford,
May 18, 1812.

To C. Taylor, M. D. Sec.

SIR,

In reply to your further inquiries,—My first keeping of bees originated from finding a swarm in my orchard, from which I have raised my whole stock. My situation is woody, between two parks, where are a great number of lime trees, from which the bees at one season of the year collect a great deal of honey. The mountain sage, which is very abundant, affords a great supply, as also the buck wheat blossom, a great many acres of which are sown in the neighbourhood.

My present stock amounts to nearly 200 hives, and I do not perceive they find any difficulty in getting food. The profit attending them I cannot with any certainty ascertain,

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ascertain, from my sometimes selling the honey, and sometimes making mead thereof. I should judge a good hive to weigh from 40 to 50 lb.

I am,

Sir,

Your obedient servant,

JOHN FINCH.

Red Heath, August 23, 1812.

To C. Taylor, M. D. Sec.

Ten Guineas *were this Session voted to Mr.* Arthur Hodge, *Bride Lane, Fleet Street, for his Invention of a Pot for Preserving Butter from becoming rancid in Warm Weather or Hot Climates. The following Communications were received from him; an Explanatory Engraving is annexed, and a Drawing of the Vessel is preserved in the Society's Repository.*

GENTLEMEN,

It is now about six years since my arrival from the West Indies, without knowing that you countenanced and held forth encouragement *for all things of useful invention,* for I had supposed that you gave premiums only *for particular objects*; until on application to a friend, I was informed

of

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of my error. Therefore I now beg leave to lay before you, a butter pot, for obtaining any reward which you may think it deserves.

I am,

with great respect,

Gentlemen,

Your obedient servant,

ARTHUR HODGE.

Twelve Bells, Bride Lane,
Dec. 16, 1811.

To C. Taylor, M. D. Sec.

Reference to the Engraving of Mr. Arthur Hodges's *Vessel for preserving Butter from becoming rancid. Plate* 1, *Fig.* 1.

This figure represents a section of the pot, which consists of three parts; first, a pot or vessel A, in which the butter is contained; this stands in the dish B; and on the top of the vessel A, is another pot C, which contains water, this latter vessel is made of that porous kind of earthenware which will permit water to pass through it.

The water therefore contained in the upper vessel C, continually percolates through the sides *a a* thereof, and trickling down the sides *b b* of the pot A, constantly evaporates, and thus produces a degree of cold which is well adapted for keeping the butter fresh, or from becoming rancid in hot weather.

Ten

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Ten GUINEAS *were this Session voted to Mr.* JAMES OGDEN, *of Dukinfield, in Cheshire, for his improved Instrument for Pruning young Trees. The following Communications were received upon the subject; an Explanatory Engraving is annexed, and the Instrument is preserved in the Society's Repository.*

SIR,

THE anxious desire I entertain for the advancement of the propagation and care of timber, will, I trust, prove a sufficient excuse for thus addressing you.

To make any observations to you upon the propriety, (nay the duty demanded by the country from those in whose power it lies) or the profit resulting from planting, would be superfluous, and merely an intrusion upon your time, but upon one process intimately connected with planting, and of the advantages and disadvantages of which there are many opinions, you, I hope, will suffer me to make a few remarks.

It is obvious to all who have attended to the growth of young trees, that upon their first venturing from the soil, one head or leading shoot is only produced; it is equally obvious, that in the course of their growth, that that shoot, from a multiplicity of causes, may be destroyed, perhaps by frost, winds, cattle, &c. and that its place is usurped by many competitors for superiority; should one or these fairly attain pre-eminence, it may be considered the leader; but if they all equally flourish, which in sycamore, ash, and many other plants, is frequently the case, the

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tree grows up a spreading, park-like tree, beautiful indeed to the painter, but to the timber-merchant not desirable.

Upon this I form my opinion, that the great *Art of Pruning*, is the suffering only one leader, or, in fact, in making your tree a perfect monarchy, the inferior branches not contending with their leader, but supplying that leader with strength to establish its vigor, and to raise the tree to an elevated rank in the forest.

Experience must instruct the woodman, what trees bear their side branches taken off, and in what cases that operation may be necessary, but all pruning is perhaps better completed ere the tree has attained its tenth year. By that time the leader has got fairly established, and the side branches so interrupted by the neighbouring trees, as not to have it in their power to become too luxuriant. After this long, and what I fear may be deemed tedious preface, I come to the purport of my letter, which is to notify to you the invention of a *Machine for Pruning*, by a person in my service. Taking myself great pleasure in attending to my own planting and plantations, I have frequently found the men at a loss how to take off one of the two or more contending leaders, from a plant perhaps 12 or 15 feet high; the plant has been too slender to bear a ladder, or a boy to climb it, too strong to be pulled down without danger of injury; in this case a mallet and chissel have generally been resorted to—a very laborious and uncertain method. The instrument now presented to your notice, fixed upon a pole of whatever height may be necessary, is suspended upon that bough which is to be cut off, by the hook; that side of the hook, contrary to which the knife acts, to be pressed close to the bole of the tree, the string which is attached to the lever then pulled, and with very little exertion the branch is amputated, and leaves a wound

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wound inflicted with such a degree of smoothness, as to cause no fear whatever of its not healing. The principle of this instrument is such, as to be capable of having its powers greatly extended, but in young plantations (and in those it was intended solely to be used,) it will generally be found to be of sufficient strength. Upon the invention of it, being myself a member of the Manchester Agricultural Society, I presented it to that body, merely wishing their opinion; that opinion, I am proud to say, was highly favourable, inasmuch as to consider the inventor deserving of one of their premiums; and since that time many of the members have patronized it by their adoption. Not wishing a patent to be obtained, which might prevent the general use of the instrument, and which, to a man with a large family, might be of too great risque to speculate in, it was suggested that the reward to the inventor might accrue from the kindness of those who, approving the instrument, chose to possess it from the hands of the inventor himself, at the price of one guinea. Should the *Dukinfield Pruner* be honoured with the approbation of any of the members of your society, I shall be gratified in ordering James Ogden, the inventor, to attend to your commands.

I have the honour to be,

Sir,

With respect,

Your most obedient servant,

FRANCIS DUKINFIELD ASTLEY.

Dukinfield Lodge, Cheshire,
October 24, 1811.

To C. Taylor, M.D. Sec.

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SIR,

I SENT this morning to the Society of Arts, &c. the Pruning Machine, invented by Mr. James Ogden, which I had the pleasure to exhibit to you last week, and which is now mounted for use. I beg leave to state, that I have seen it employed, for the purpose of experiment, and that it appeared to me at once simple and powerful, and excellently adapted to the purpose for which it is intended.

I have the honor to remain,

Sir,

Your obedient servant,

LOUIS HAYES PETIT.

No. 9, New-Square, Lincoln-Inn,
April 28, 1812.

To C. TAYLOR, M. D. SEC.

MY LORD DUKE,

UNDERSTANDING that the Society for the Encouragement of Arts, Manufactures and Commerce, over which your Grace presides, have complimented James Ogden, my servant, with a premium for his invention of a pruning instrument, I beg leave to recommend it to your Grace's patronage, as a very useful invention. I should not have taken this liberty with your Grace, if I did not think,

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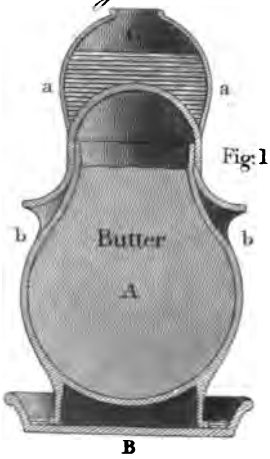
Mr. Hodges's Pot for preserving Butter.



Mr. Ogden's Implement for Pruning Trees.

Mr. Wm. Sampson's Churn.

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Engraved by J. Porter

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think, that the encouragement shown to a livery-servant might be an excitement to others in similar situations, to make a far different use of the great leisure they possess, than what they frequently do.

I may perhaps be allowed, before I conclude, to say, that I have, this last season, used the instrument in pruning my own plantation, in Cheshire, and that I am persuaded it has saved me an expense of, at least, twenty pounds in mens' wages.

I have the honor to be,

My Lord Duke,

Your Grace's most obedient, and

very humble servant,

FRANCIS DUKINFIELD ASTLEY.

Dukinfield Lodge, May 23, 1812.

His Grace the Duke of Norfolk,
President.

Reference to the Engraving of Mr. James Ogden's *Instrument for Pruning young Trees. Plate* 1, *Fig.* 2.

This instrument consists of a long pole A B, on the top of which a pair of shears, of a peculiar construction, is fixed, they consist of a hooked blade C, having a flat shank, which is fixed, by its tang, into the top of the

 pole,

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pole, which end of the pole has a ferrol upon it also; to this the moving blade E, and its handle or lever *d k*, is united, by the centre pin *d*; the tail, or end *k*, of this lever, has an eye, to receive a rope C, which comes down within reach of the person who holds the pole A B; and it is plain, that by pulling this, the blades shut, and will readily divide any small branch which is introduced between their edges. The particular excellence of these shears, consists in the hooked form of the fixed blade C, and in the peculiar curvature of the moving blade E, which is such, that it cuts with a drawing motion, and will therefore divide a branch more completely and clearly, than by shears of a common construction. *h*, is an arm proceeding from the shank *a*, at the end of which is jointed a V spring *i*, the other end of which is lodged in a gap in the lever *d k*, and constantly presses the tail *k* upwards, thus tending to separate the blades, and open the shears; near *h*, a pin or stud is fixed upon the flat shank, which stops the blade E from opening too wide by the action of the spring *i*; and it is prevented from being pulled too far downwards by resting upon the closed spring.

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The SILVER MEDAL *and* TEN GUINEAS *were this Session voted to Mr.* WILLIAM SAMPSON, *No. 20, Great Wild-street, for his Invention of a Churn, by which Butter may be easily and quickly made. The following Communication was received from him, an Explanatory Engraving is annexed, and the Churn preserved in the Society's Repository.*

SIR,

I HAVE left a small churn, of my invention, for the inspection of the Society, it hath actually been employed in making butter, and answered well for that purpose; it works with ease, and the mechanical power will be found to be applied to the best advantage.

I am,

Sir,

Your humble servant,

WILLIAM SAMPSON.

20, Great Wild-street, Lincolns-Inn-Fields,
Oct. 23, 1811.

TO C. TAYLOR, M. D. SEC.

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Reference to the Engraving of Mr. WILLIAM SAMPSON'S *Churn. Plate* 1, *Fig.* 3.

A A, is a common barrel churn, the churn-staff B of which is pumped or worked up and down by the following mechanism: the staff is fastened to the cross-bar C, and from this two upright rods, D D, descend to the lowest part of the machine, being guided by passing through staples fixed in the frame; at the lower end of them, two rods, F G, are jointed, the upper ends of these rods are connected with cranks, or levers, H I, which are fixed upon a horizontal axis K, and this also carries a long pendulum or lever, L, which governs the motion; this being swung backwards and forwards by hand, alternately elevates and depresses the churn-staff B, and two beaters within the churn which are fixed upon it.

The LESSER SILVER MEDAL *of the Society was this Session voted to Mr.* MILES BRAITHWAITE, *of Kendal, in Westmoreland, for his Plantation of Sixty Thousand Timber Trees, near Hawkshead, in Lancashire. The following Communications were received from him.*

SIR,

IMPRESSED with a due sense of the valuable services which the Society of Arts, &c. render to the world, I beg

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beg leave, through your medium, to offer myself to their notice. Neither fortune nor particular circumstances can entitle me to a reward under any of the articles mentioned in the Society's list of Premiums, but relying on the well known liberality which has always distinguished the Society, I trust that I shall not apply in vain, resting on their professions of rewarding improvements, though not particularized in their list of Premiums offered.

Coming into possession of a small estate early in life, in which there was a quantity of rocky sheep pasture, of little value in its natural state, situated amongst the lakes, and similar to that for which the Society rewarded the plantations made by the Bishop of Llandaff, J. C. Curwen, Esq. and Doctor Ainslie, I was induced to follow their example as far as I was able.

When the Society considers the large fortunes those gentlemen possess, in comparison with mine, at the time I commenced my plantations, and that at the time I planted upwards of sixty thousand trees for timber my income was very small, I hope my humble endeavours will be entitled to their attention, and that my exertions will be found equal, if not superior, to those whose fortunes are so infinitely beyond mine, and will afford a lesson to some of the younger sons and daughters of persons who are rich, but who cannot leave all their children great fortunes.

My largest plantation was made in the winter of 1807 and 1808, and was upheld by the person I contracted with for three years. Providence favoured my endeavours, the first winter being so wet that scarcely a tree died.

The trees planted are suitable in species to the situations, and planted in such a bleak spot, that it could not have been applied to a better use.

The

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The plantation which I call the Intack, is situated on a steep declivity facing the north and west, and of course exposed to the most tempestuous winds of this part of the country. I have attempted to guard against them by forming a deep belt of Scotch firs in front, and also planting them on the highest parts of the ground. The others are various sorts of timber trees. I should have been glad to have mixed more oaks with them, but the poverty of the soil, and bleak situation, would not admit of it. Indeed I had great prejudices of the country people to overcome in making my plantations, but I am certain, that when the trees are cut down, at a distant period, that the land underneath them will be found much improved, from the annual decay of the herbage and fall of the leaves. The plantation is well-fenced from the depredations of cattle. The ground was prepared for planting, by burning off the ling, the soil was loosened by the spade and pick-axe, and the trees carefully and firmly planted in a quincunx form, at four feet distance each way; the quantity of land is about twenty-two and a half acres, but interspersed with rocks. Inclosed, you have certificates from C. Watson, the planter; R. Brockbank, an industrious house-carpenter; and John Satterthwaite, a respectable farmer.

I am, Sir,

Your's very respectfully,

MILES BRAITHWAITE.

Kendal, Nov. 30, 1811.

To C. Taylor, M.D. Sec.

A Certificate

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A CERTIFICATE was received from CHARLES WATSON, ROBERT BROCKBANK, and JOHN SATTERTHWAITE, dated Hawkshead, Nov. 25, 1811, stating, that they had inspected Mr. Braithwaite's plantation, and it was their united opinion, that they had never seen a more thriving plantation, when the soil and situation is considered. That there are larch trees which measure nine feet and upwards, and Scotch firs five feet nine inches; and that the number of sorts are as follow, in the Intack plantation: viz.

Larch	-	-	-	45,600
Scotch	-	-	-	7,200
Ash	-	-	-	500
Oaks	-	-	-	500
Beech	-	-	-	3

Besides 1,200 larches in Foulgate plantation, independent of other trees planted in Strickland, of which they make no report.

PAPERS

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PAPERS

IN

CHEMISTRY.

TWENTY-FIVE GUINEAS *were this Session voted to Mr.* CHARLES WILSON, *No.* 35, *Worcester-st. Borough, for his Invention of a Composition, forming a Substitute for Portland-Stone Chimney-pieces. The following Communications were received from him, and a Model of such a Chimney-piece is preserved in the Society's Repository.*

SIR,

I BEG leave to lay before the Society instituted for the Encouragement of Arts, &c. a substitute for Portland-stone Chimney-pieces, made by me, and no other person, at

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at present, in this kingdom, and with such certificates of their utility, as, I trust, will prove satisfactory.

I am, most respectfully,

Sir,

Your very obedient servant,

CHARLES WILSON.

No. 35, Worcester-Street,
Queen-Street, Borough of Southwark,
Jan. 28, 1812.

To C. TAYLOR, M. D. SEC.

Mr. WILSON'S *Process for Artificial Stone Chimney-Pieces.*

TAKE two bushels of sharp drift sand, and one bushel of sifted slacked quicklime, mix them up together with as little water as possible, and beat them well up together for half an hour, every morning for three or four successive days, but never wet them again after their first mixture.

To two gallons of water, contained in a proper vessel, add one pint of single size, made warm; a quarter of a pound of allum, in powder, is then to be dissolved in warm water, and mixed with the above liquor.

Take about a shovel full of the first composition, make a hole in the middle of it, and put therein three quarters of a pint of the mixture of allum and size, to which add three or four pounds of coarse plaster of paris; the whole is to be

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be well beaten and mixed together rather stiff; put this mixture into the wooden moulds of your intended chimney-piece, the sides, ends and tops of which moulds are made of moveable pieces, previously oiled with the following mixture.

Take one pint of the droppings of sweet oil, which costs about one shilling the pint, and add thereto one pint of clear lime water, made from pouring boiling water on lumps of chalk lime in a close vessel till fully saturated, when the lime water becomes clear, it is proper to be added to the oil as above-mentioned, and on their being stirred together they will form a thick oily mixture, or emulsion, proper to apply upon the moulds.

In forming the side or jamb of a chimney-piece, the mould is to be first half filled with the sand-lime and plaster composition, then two wires wrapped round with a thin layer of hemp, and which wires are nearly the length of the piece to be moulded, are to be placed in parallel lines, lengthways, in the mixture or composition in the mould, and afterwards the mould is filled up with more of the composition, and if there is any superfluous quantity, it is to be struck-off with a piece of flat board.

The lid or top part of the mould is to be then placed upon it, and the whole subjected to a strong pressure from weighted levers or a screw press. The composition is to remain under this pressure for twenty or thirty minutes; the precise time necessary may be known, from examining a small specimen of the composition reserved purposely to determine the time it requires to harden and set firm.

The sides of the mould are to be held together by iron clamps and wedges.

The wires above-mentioned answer a double purpose, by

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by giving strength to the jambs, and retaining the whole mass together in case it should at any time be cracked by accident.

The chimney-pieces may be made either plain or fluted, according to the mould, and when moulded, they are finished off by rubbing them over with allum water, and smoothing them with a trowel and a little wet plaster of paris.

A common plain chimney-piece of this composition, is sold at only seven shillings, and a reeded one at twenty-eight shillings, completely fitted up.

CERTIFICATES *were received from the following Persons.*

Mr. GEORGE SMART, of Ordnance Wharf, Westminster Bridge, who had tried these chimney-pieces for three years, and found them a valuable article.

Mr. J. WILLOUGHBY, who had fitted-up nine rooms with these chimney-pieces, in York-street, Broadway, Westminster.

Mr. WILLIAM SIMPSON, Hackney-road, who had furnished four rooms with them.

Mr. BUTLER, Weymouth-place, Hackney, who had fixed them in sixteen rooms.

Mr. CHERRY, who had fixed them in eight rooms, near Cuckfield, in Sussex.

The general tenor of the above certificates show, that they have found these chimney-pieces to answer the same purpose as those made of Portland-stone, and provided at half the expense.

The

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The THANKS *of the Society were this Session voted to* H. B. WAY, *Esq. of Bridport Harbour, for the following Communication received from him, and for some excellent Bread which he furnished to the Society, made from a mixture of Wheat Flour and Potatoes, in conformity to his orders, by his Servant, Hannah Peters.*

SIR,

I HAVE sent to the Society of Arts, &c. a loaf of bread made from a mixture of wheat flour and potatoes. The principle I have adopted from a publication of Edlin's, and I have now got it in such perfection, that I and my family prefer it to bread made wholly of wheat flour. It has the valuable property of keeping many days longer in a moist state, which, in the country, where it is impossible to get fresh bread or yeast every day, and where persons can perhaps only conveniently bake once a fortnight, is a very great advantage. I had many prejudices to encounter in the first attempts I made, and I think great merit is due to my servant, Hannah Peters, for her perseverance and success, both in the making of it, and management of my oven in baking it, as both she and my neighbours were originally much prejudiced against my experiments in this line. I annex, for the Society's inspection, a statement of the cost and saving by the use of potatoes, and I hope, by degrees, this method will be extensively practised. I am sure, if the subject is noticed in the Society's volume, it will greatly contribute thereto. This

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is the second year that I have constantly used this mixed bread, from the latter end of October to the latter end of May, and I assure you that it is a matter of great regret to my whole family, when, from the scarcity of potatoes, we commence the use of bread made wholly from wheat.

I am, very respectfully,

Dear Sir,

Your obedient humble servant,

H. B. WAY.

Bridport-Harbour, March 10, 1812.

To C. TAYLOR, M.D. SEC.

Process for making Bread from Potatoes and Wheat Flour, as practised under the direction of H. B. WAY, *Esq. March* 10, 1812.

SIXTEEN pounds of potatoes were washed, and when pared weighed twelve pounds. After boiling they weighed thirteen pounds, and were then mixed, whilst warm, with twenty-six pounds of flour, the potatoes were bruised as fine as possible, and half a pound of yeast added. Four quarts of warm water were added to the mixture of potatoes, yeast and flour, and the whole well kneaded together, and left two hours to rise, and then weighed forty-six pounds and four ounces. The whole made six loaves and two cakes, which were baked at two separate times, in my iron oven, each baking taking two hours. The six loaves

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loaves and two cakes the day after being baked, weighed forty pounds and twelve ounces.

The oven is made of wrought iron on Count Rumford's plan, to heat from a separate fire-place. The time from the fire being lighted till the bread was baked at twice, was five hours, in which time six pounds of Walls-end coals and three pounds of cinders were consumed, besides a small quantity of wood used merely to light the fire.

Expenses of Bread made from a mixture of Potatoes and Wheat Flour, and comparisons in price with Wheaten Bread.

March 10, 1812.—16 lb. of potatoes paired and boiled, weighed 13 lb.; 4 lb. allowance for interest and loss on the stock bought in October, 1811, say 25 per cent. makes,

	s.	d.
20 lb. of potatoes, at 6 *s.* 6 *d.* per sack of 240 lb. the actual price when bought, October, 1811.	0	6½
26 lb. of fine flour, at 5 *l.* per sack of 280 lb.	9	3½
Half a pint of yeast - - -	0	2
6 lb. of coals, at 2 *l.* 18 *s.* 6 *d.* per chaldron, of 2808 lb. - - - -	0	1½
5 lb. of cinders, and wood for lighting fire, -	0	1½
	10	3
40 lb. 12 oz. of bread at the above date, at 1 *s.* 4 *d.* the quartern loaf, of 4 lb. 5 oz. 8 drams, would have been - - - -	12	6
Leaves a saving of - - -	2	3

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	lb.	oz.	drams.
26 lb. of flour at the rate of 80 loaves, of 4 lb. 5 oz. 8 drams each, to the sack of 280 lb., would only have made	32	4	4
Gain in bread by 16 lb. of potatoes, is more than half a pound of bread for each pound of potatoes - -	8	7	12
	40	12	0

The iron oven has been in use more than 15 years, it is 20 inches deep, 16 inches wide, and 16 inches high; and has been recently fresh set to heat from a separate fire-place, which is 10½ inches deep, 7½ inches wide, and 7 inches high, the bars of the fire-place 14 inches from the bottom of the oven.

Mr. Way's bread had been sent from Bridport Harbour to the Society on the 10th of March, 1812; and had been examined and tasted at sundry times by members of the Society, from the 12th to the 26th of March, so that the greatest part of the loaf had been eaten, what remained, on the 26th, had every appearance of bread made wholly from wheaten flour well fermented, and well tasted, without being in the least mouldy or stale, though it had been baked fourteen days. It appeared to the Committee to be a very successful mode of making bread, and that it might tend to lessen the consumption of flour, an object of considerable national importance.

The

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The THANKS *of the Society were this Session voted to the* CORK INSTITUTION, *for fourteen specimens of Irish Marbles presented by them, along with the following Communication. The specimens are fixed in the Great Room of the Society.*

SIR,

HAVING an opportunity of sending to the Society of Arts, &c. a collection of marbles from the County of Cork, by Mr. Henry Shanahan, the son of a very respectable architect here, I gladly avail myself of it, and request the Society will accept of them as a small tribute of respect from the Cork Institution, and sent by desire of the Managers. I also send a copy of the charter of that body, which embraces the joint objects of the Dublin Society, and Farming Society of Ireland, with the exception of the fine Arts.

I am, Sir,

With much respect,

Your obedient humble servant,

THOMAS DIX HINCKS,

Secretary of the Cork Institution.

Cork, January 10, 1812.

TO C. TAYLOR, M. D. SEC.

No. 1. Ballianahan Marble in the County of Cork, 20 miles from the City of Cork.

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2. Tralee Marble, County of Kerry.
3. Ditto.
4. Black Rock Marble, 3 miles from the City of Cork.
5. Bishops Town ditto, 3 ditto ditto.
6. Ovens ditto, 5 ditto ditto.
7. Castlelyons ditto, 14 ditto ditto.
8. Tralee ditto, County of Kerry, ditto.
9. Mitcheltown ditto, County of Cork, 14 miles from the City of Cork.
10. Kilcree ditto, 6 ditto ditto.
11. Rochy Island ditto, 8 ditto ditto.
12. Rostellan ditto, 16 ditto ditto.
13. Kilkenny Marble.
14. Clonmel Marble, County of Tipperary, 40 miles from the City of Cork.

All the above descriptions of Marble are found in great abundance, and the quarries are convenient to land and water carriage.

H. SHANAHAN.

Cork.

PAPERS

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PAPERS

IN

POLITE ARTS

Twenty GUINEAS, *the Premium offered in Class* 120, *were last Year adjudged to Mr.* R. D. CATHERY, *No.* 12, *Mead Row, near the Asylum, Lambeth, for his Method of fixing Chalk Drawings; the following Communication was received from him, and the specimens referred to, preserved in the Society's Repository.*

SIR,

HAVING tried several experiments for the purpose of ascertaining the best, and most effectual method of fixing black and white chalk drawings, I have selected a few specimens from among them, for the inspection of the gentlemen of the Society of Arts, &c.; and have fully explained each method in the annexed paper according to the number of each specimen, hoping at the same time they will excuse the rough manner in which they are done, as it was not in my power to make drawings; they will,

 however,

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however, shew that the chalk is fixed without staining the paper, or in any way injuring the drawing.

Specimen, No. I

Will bear rubbing with India-rubber with very little alteration, unless it is rubbed so hard as to injure the paper; drawings in crayons may be fixed in the same way.

Specimen, No. II.

Will bear rubbing with India-rubber without any alteration; each method is very simple and not expensive.

Specimen, No. III.

Is performed by the artist making his drawing on soft paper that has not been sized, such as blotting-paper; and when it is finished washing the back of it over with a wash, and when quite dry, no rubbing can injure it, and it will harden the paper and not stain it in the least. Drawings in different coloured crayons may be fixed by the same method. This wash will be an excellent thing to wash prints with that are printed on soft paper, as it not only hardens the paper, but prevents them from being so easily stained and damaged, which soft paper is so liable to do by handling, as it is of so spungy a nature that it soaks up directly the least wet or grease it touches, and this wash is a great preserver of the paper. Aquatint prints that are printed in colours are always printed on hard paper, because

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because soft paper will not do to tint with water colours, on account of the colour sinking quite through directly as it touches the paper, which the wash totally prevents. You may colour on soft paper that is washed over as well as you can on hard; better impressions can be taken on soft paper, and when washed over and pressed they cannot be distinguished from hard paper; so that printers may entirely give up the use of hard paper, as it is not fit for such delicate plates as aquatint, or mezzotint, &c. Old prints on soft paper that are broken and stained, if they are nicely cleaned and washed over, it will harden and make them look well when they are pressed, as it will take out the creases, and prevent any acid that they have been cleaned with from rotting the paper.

Specimen, No. IV.

Is washed half over on purpose that the gentlemen may see the utility of it, and try the effect of it with a pencil and colour, and to show that it does not stain or injure the paper in the least. I was obliged to do the specimen No. III. on blotting-paper, as I could not now get any paper for drawing on without the size; but if this method is approved of, I can get paper for drawing on of any colour or thickness, by ordering it at the paper manufactory to be made without being sized.

R. D. CATHERY.

February 25, 1811.

To C. Taylor, M.D. Sec.

Process

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Process for Mr. Cathery's Methods of fixing Chalk Drawings.

Specimen, No. I.

Dissolve one ounce of the clearest gum arabic in one pint of spring-water, (beer measure,) then take a piece of the best blotting-paper according to the size of the drawing, and with a piece of sponge wet it all over; then lay the drawing on a table and lay the wet blotting-paper on the drawing, and press it gently with the hand close to the drawing, so as to just damp the chalk which may be seen by raising the paper up, and where the chalk is not damp press it on again; and when the chalk is thoroughly wet all over, the paper may be taken off; and in about ten minutes the chalk will be dry and fixed. The blotting-paper must not be too wet, and when you take the paper off the drawing, mind it is not shifted sideways, as that will evidently smear it.

Specimen, No. II.

Dissolve one ounce of the clearest gum arabic in one quart of spring water, (beer measure,) pour it into a dish according to the size of the drawing, then pass the drawing hastily through it, and lay the back of the drawing on a sheet of blotting-paper upon a slanting board, so that the water may drain off; and when the drawing is perfectly dry, you may press it in a port-folio with a weight upon it, and it will be quite flat, but if pressed while it is damp it will cockle.

Specimen,

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Specimen, No. III.

To half an ounce of isinglass add one quart of water, and let it boil for a quarter of an hour in an earthen pipkin, then add two drachms of powdered allum, and when that is dissolved strain the mixture through a piece of clean linen, and while milk warm wash the back of the drawing over with a piece of sponge, and take care that nothing rubs the front of the drawing; it must be handled very gently, and when quite dry put in a press.

Specimen, No. IV.

For prints on soft paper, to half an ounce of isinglass you must add two quarts of water, with the same quantity of allum; wash the back of the prints over with it, and when dry they may be coloured with ease; the colours will not sink.

R. D. CATHERY.

No. 9, Mead Row, near the Asylum, Westminster Road.

SIR,

I FIND that the best method of fixing the chalk on No. 3, the soft paper, is to get a square frame, (such as they strain canvass on for painting,) and tack the drawing on it with eight small nails, the front of the drawing towards the table, then holding the frame slanting, take the solution of isinglass and allum, and with a large camel's hair pencil wash

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wash the back all over with it, so as just to wet the paper quite through and no more, and it will dry quite smooth; this method is the best as nothing can damage the front of the drawing, the frame preventing the table or any thing else from rubbing the chalk or crayons, if ever so highly finished. The camel's hair pencil is better for use than the sponge, as you may use it more gently and with greater ease.

I am, Sir,

Your obedient servant,

R. D. CATHERY.

May 16, 1811.

To C. TAYLOR, M. D. SEC.

Five GUINEAS *were this Session voted to Mr.* R. D. CATHERY, *No.* 9, *Mead Row, near the Asylum, Lambeth, for Transparent Paper, for the use of Engravers and Painters. The following Communication was received from him, and specimens of the article are preserved in the Society's Repository.*

SIR,

I HAVE sent you a quire of tracing paper for the inspection of the gentlemen of the Society of Arts, &c. I am sorry I could not send it in sooner, but an accident happened to some I had made for the purpose of sending you,

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you, in consequence of which I was obliged to delay the time a little longer that I might make more. It will be of great use to engravers, as it will not turn yellow, as the tracing paper now in general use is apt to do; which takes off the transparency, and prevents the artist from seeing the drawing or painting that is under it so plain as he could wish, particularly if the drawing or painting is very delicate, or of a yellowish colour. It is very transparent, and as the pencil will mark better on this than it will on the yellow paper, it will be the better for those that trace on the ground, that is laid on the copper by means of a point and a coloured paper under it, as they will see the tracing plainer, and if laid on the copper-plate that has a ground on it, and passed through a printing press, the marks of the pencil will adhere quite perfect to the ground, and as the tracing paper is dry, it will not stick to the ground and tear it up as the other paper will sometimes, on account of its being fresh made, for if kept long it will turn yellow and thick. The longer my paper is made the better it is, and keeps clear and white. I can make and sell it for the same price as the paper which is now made; you may trace or write with a pen and ink on it, if the ink has a little ox-gall put into it. I have made and sold several quires, and have got some at home now for sale. If the gentlemen of the Society of Arts, &c. approve of it, their sanction will be of infinite service to me, as it will considerably tend to increase the sale of it.

I am, Sir,

Your obedient humble servant.

R. D. CATHERY.

No. 13, Mead Row, near the Asylum.

To C. Taylor, M. D. Sec.

The

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The Preparation.

Take one quart of the best rectified spirits of turpentine, and put to it a quarter of an ounce of sugar of lead finely powdered, shake it up, and let it stand a day and night, then pour it off, and add to it one pound of the best Canada balsam, set it in a gentle sand heat, and keep stirring it till it is quite mixed, when it will be fit for use; then lay your paper on a smooth board, and with a large brush, brush your paper over very even with the mixture, and then hang it upon lines to dry, and it will be fit for use in about four days.

R. D. CATHERY.

To C. Taylor, M. D. Sec.

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IN

MANUFACTURES.

In the 23rd Volume of the Society's Transactions, it is recorded that the SILVER MEDAL *and* FORTY GUINEAS *were that Session voted to Mr.* JOSEPH BEARD, *of Coggeshall, in Essex, for a Machine for Crooking and Cutting Wires for Cards employed in Carding Cotton and Wool. The Communications relative to this business are printed in that Volume without any Descriptive Plate, owing to the difficulty which occurred at that time of explaining the construction of the Machine by a Drawing; this difficulty has been since overcome by the exertions of Mr. Farey, Jun., and the annexed Engraving will convey a just and accurate account of this useful Machine.*

Reference

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Reference to the Engraving of Mr. Beard's *Machine for Crooking and Cutting Card Wires. Plate* 2.

The machine itself is double, having parts to make two complete card wires at once; it receives two wires at once from two reels, on each of which a coil of wire is placed, the wires pass between a pair of rollers by which they are drawn into the machine, which cuts off a proper length, from the ends, and bends the pieces into the proper form, then drops them into a drawer beneath, and proceeds with two others in constant succession; our draughtsman has found it necessary, for simplicity, to exhibit only one half of the machine, which is however by itself a complete machine; and in this division some alterations were necessarily made in the form of some few of the parts, which were in the original, common to both halves. This drawing is not therefore to be considered as an exact representation of the machine in the Society's possession, though it contains all the essential parts and movements. A A, fig. 2, is the main axis, which puts all the parts in motion, it has a fly-wheel C, fixed on the end of it, and is turned round by a handle B, or it might receive its motion, from any machinery, by an endless band or strap, and pulley, as it does not require any attendance.

The wire *a a* is conducted from the reel before-mentioned, to the machine, and first passes over a rest or frame *b*, which has a notch in each of its sides, to receive the wires and to keep it down in these notches; it is also passed through a wire eye or ring *c*, to which a sufficient weight is appended to cause such a friction as will keep the wire steady.

The

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The wire next passes through a guide formed by a hole in a piece of iron *d*, fixed by screws to a vertical standard G, rising from the iron frame F F, on which the whole mechanism is erected; by the guide *d*, it is presented to a pair of rollers or wheels D, by which it is drawn forwards; these wheels are exactly of the same size, and being beneath each other, only one can be seen in the figure; the lower roller which is hidden, is fixed upon an axis which extends across the frame, its ends being supported by the joints of the center screws 20 20, the axis is turned round by means of a teethed wheel 7 upon the main axis, acting in another exactly similar to it, fixed immediately beneath upon the axis of the lower rowler, which is perpendicular to the main axis; but the teeth of the wheels being both inclined at an angle of 45 degrees to their respective axis, become parallel at the points of contact, and the wheels turn each other round by a similar action to the endless screw; from which however this mode of communication differs most materially, in the circumstances of the two wheels or screws, (for they partake the nature of both,) being of equal dimensions and similar forms. This communication causes the lower roller to make a revolution for every one of the main axis, at the opposite end of the axis of the lower roller a cog wheel is fixed, and operates upon another, E, of exactly similar dimensions, and placed over it so as to conceal the former; this wheel is fixed upon the axis, (shown by dotted lines,) of the upper roller D, which is mounted upon the points of center screws held in a frame marked I I; this frame is attached to a standard G, of the frame F F, by two center screws, so that it will rise on the points of these as on an axis, and thus permit the upper roller to rise and fall to accommodate itself to the wire,

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and press it so fast upon the lower roller as to draw it forwards; the pressure is occasioned by a strong spring K fixed on the frame I, and its end hooked beneath a projecting part (not shewn) of the standard G. The rollers D, deliver the wire into a steel tube *ef*, (see also fig. 3, where it is shown separately,) the hole through which being but just large enough to admit the wire, straightens it in the manner of dies, and together with the rollers completely takes out any crooks in the wire; the tube *ef* is made in two halves, which are held together by the same clamp screw which fastens them into the bracket L supporting them. The end *f* of the steel dies, which is enlarged, as shewn in fig. 3, and has a smooth flat face, is the point where the wire is cut off by means of a small knife *g*, fixed into an axis M, on which is a lever, 5, actuated at the proper interval by the lever or claw 4, on the main axis A, into which it is screwed, and can therefore be readily adjusted in length, to operate more [illegible] upon the lever 5, by which it cuts off the w[illegible] point where it emerges from the end *f* of the die[illegible] length of wire which is advanced through the dies [illegible] it is cut off, is measured by the end of the wire co[illegible] up to the flat head of a screw 10, supported by a b[illegible] L, but the instant the wire reaches this, the upper [illegible] D is lifted up so as to relieve the pressure upon the [illegible] this is done by a cam 1, which has a part of the fr[illegible] projecting over it, and at the end of it is a tooth or [illegible] fastened by the square nut, this tooth is lifted up b[illegible] cam which is a circle having a deep notch cut in it; [illegible] thus relieves the wire when the circular part of the [illegible] comes beneath it, and though the motion of the [illegible] continues, the wire remains stationary; the notch p[illegible] itself beneath the tooth of I; the spring K now pre[illegible]

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Pl. 11.

Fig: 1.

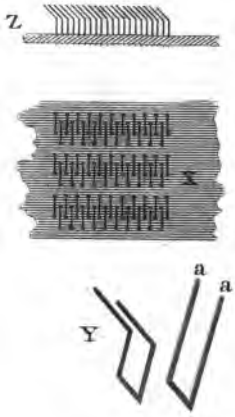
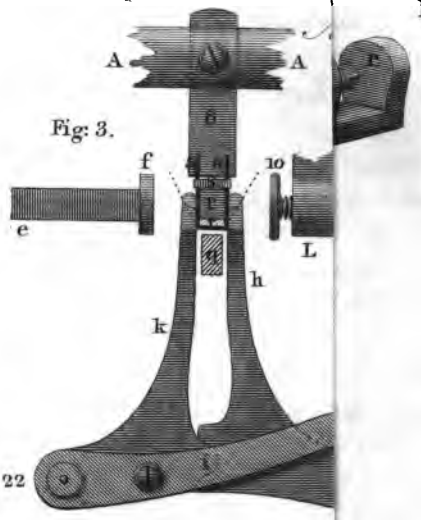
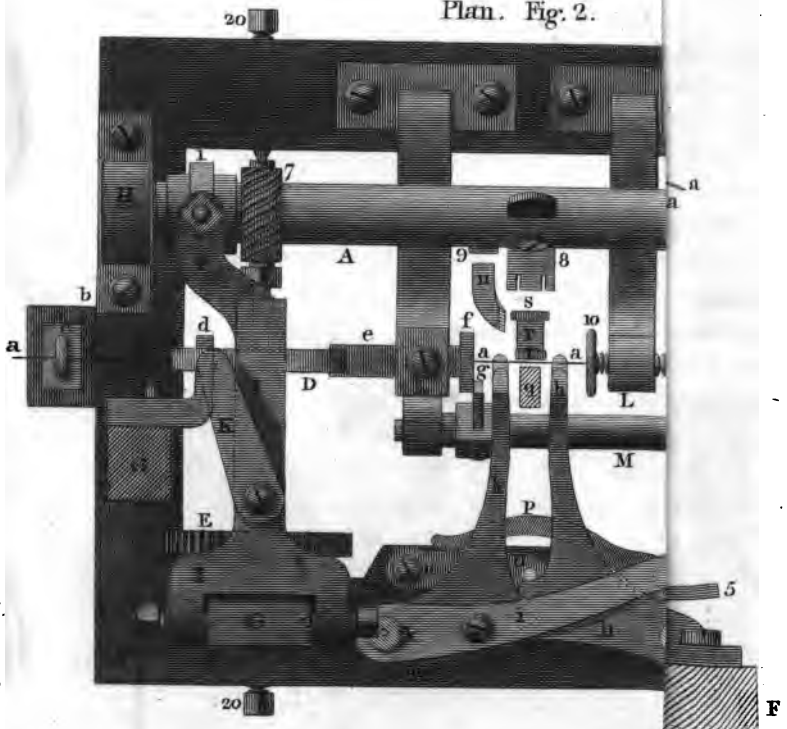


Fig: 3.



Plan. Fig: 2.



Drawn by J. Farey.

Engraved by S. Porter.

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upper roller upon the wire, which is then pushed forward until the proper measure is advanced, when the upper roller will be again lifted up by the cam as before-mentioned; this movement is therefore devoted to measuring the wire, the roller and dies *e f* to straightening it, and the shears or cutter *g*, to cutting it off into the lengths measured by the screw 10. We have now to explain the mechanism for doubling and bending; these parts are in the plate shown of their real size to render them distinct, though all the other parts are only half the full size. The wire when advanced by the rollers is introduced between two pieces of metal *g* and *t r s*, these are shown in all the figures; in figs. 2 and 3 they are only represented by small squares, but figs. 4 and 5 shew them to be the ends of levers *q* and *r*, moveable on one common axis, but independently of each other; they are called the back and front blades of the plyers, their axis of motion is parallel to the main axis A, and is suspended between the points of center screws supported by the standards G G; this forms the axis of the lever *r*, as shewn in fig. 4, which only represents the moving parts; the axis of the lever *q*, marked 15 15, swings between the points of center screws attached to a part of the lever *r*, but exactly in a line with the two fixed center screws on which *r r* itself moves; thus both blades of the plyers move in the same central line, but independently, they have therefore a motion directly to and from the main axis, but no other; the two levers *q* and *r* have a small spring 19, figs. 4 and 5, between them, which always tends to separate them and open the plyers. The axis 15 of *q* has a short tail or lever, 18, rising from it, which stops against an adjusting screw 16, fig. 5, and determines the quantity of approach the end of the blade *q*, (fig. 2, 3, and 5,) shall make towards the main axis; 17

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is a spring of a semicircular form always drawing the tail 18 towards the screw 16, and consequently urging the blade *q* towards the main axis, the spring 19 also urges the front blade *t r s*, (fig. 2, 3, and 5,) towards the axis till the arm 11, (screwed to it,) rests upon the outside of the axis, a cam, 9, is fixed on the axis at this part, and when it comes round acts upon 11, and by it forces the blade *t r s* away from the main axis till it comes in contact with the wire *a a*, (figs. 2 and 4, and shown in fig. 5 by a small black dot surrounded by a white circle,) and presses it against the blade *q*, then holding it in the manner of a pair of plyers, or a finger and thumb, whilst the shears cut it off; all this time the blade *q* may be considered as stationary, the spring 17, fig. 5, which opposes its retreat from the main axis, being so much stronger than 19, which opens the plyers, but as the cam 9 turns farther round, it continues to press the arm 11, and the front blade with it against the wire, and by this against the other blade *q*, so as to force the plyers back all together on their common axis of motion into the position fig. 3; now the two ends of the wire being supported by the ends of two levers *h* and *k*, whilst the middle of it is thrust back by the plyers, it is doubled, or has given to it the form of a staple; the action of the levers *h* and *k*, which are called the side-benders, must be explained before this can be clearly comprehended: they have each a motion on their respective center pins or axis, 21 22, fixed in a plate screwed upon the framing F; these two levers have arms approaching each other in a direct line from one center to the other, and where they meet have a tooth *i* on the lever *k* entering a notch in *h*, and operating in the manner of a cog, to cause any angular motion, which is given to one lever to be communicated equally to the other; this causes the ends of

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of *h* and *k* where they operate upon the wire, to mutually advance and recede from each other by equal quantities, the motion is given to the benders by a lever *k l*, which is part of *k*, but has no connection with *h*, though it passes over it; to the end of *k l*, a rod *l* is jointed which passes over the main axis, and has a stud or tooth fastened by the square nut, which is operated upon by a cam on the main axis, and at the proper interval draws *l* and *k i*, and thus opens the benders *k* and *h* in the manner shown in fig. 2, when this cam passes by the benders shut, or approach each other by the force of a spring *p*, this operates on a lever *n*, which has a pin *o* rising from it, and pressing back the tooth of the lever *h*, gives them a tendency to shut; this they do the instant the cam has relieved the lever *k l*, which retires till it rests against a screw *m*, determining the nearest distance they approach to each other as in fig. 3, and the regulation of the cam on the tooth of the rod *l* which it acts upon, (by means of its square nut,) determines the greatest openings they can have, as in fig. 2 and 4; the ends of the levers *k* and *h* where they act upon the wire have notches in them, through which the wire passes in the first instance before doubling, this is shown in figs. 2, 4, and 5; *t* and *s* are small plates of steel screwed at the two sides of the front blade *r*, of the plyers forming its faces, over these the wire is doubled by being thrust in between the side-benders, which then close together, as shewn in fig. 3 and also in fig. 7; in this state the two legs of the wire, being doubled in the form of &, fig. 1, pass just beneath two shoulders formed upon the steel blade *s*, fig. 4, in the manner explained in fig. 7; these shoulders will of course prevent the legs of the wire staple from rising, and they are bent into the shape of Y, fig. 1, by a lever 8, fixed in the main axis, which passes by at the

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proper time, and raises the points *a a*, figs. 3 and 7, so high as to give them the proper quantity of knee-bend, this forms the card wire, and when the cams pass by, the plyers and side-benders open into the position of fig. 2, and the card wire drops into a box beneath the machine; considering the position of fig. 3 as the point of commencement, we will recapitulate the movements of this ingenious machine to render its operation distinct, and shew the periods of the different parts of the process. On turning the main axis in such a direction that the handle B, fig. 2, descends, the cams act in the following succession.

1st. The notch of the cam 1, suffers the roller D to press upon the wire, and thus holds it fast between the upper and lower rollers, which as they turn round,—

2ndly, Advance the end of the wire *aa*, through the dies *ef*, before the notches in the ends of the side-benders *h* and *k*, and between the plyers *q*, and *t r s*, until the end of it reaches the screw 10, at this instant,—

3rdly, The cam lifts up the upper roller D, and the friction on the sides of the frame *e*, prevents its further advance, this is the state in which figs. 2, 4, and 5, represent the machines.

4thly, The cam 9 presses on the arm 11, and forces the blade *r* of the plyers back till the side *t* meets the wire, and removing it backward holds it fast against the front of the blade *q*, and pinches the wire tight between the two jaws of the plyers, whilst,

5thly, The cam 4 depresses the lever 5, and by the cutter *g* cuts off the wire instantly, leaving it held by its middle between the plyers.

6thly, The cam 9 continuing its motion, drives back both parts of the plyers together and the wire with them, its

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its ends being supported by the ends of the side-benders, it assumes the bend of the dotted lines in fig. 2, (though the plyers are not there represented as thrown back).

7thly, A notch in the cam of the main-axis under the rod *l*, now presents itself, and suffers the spring *p*, to close the side-benders *h* and *k* together, as shewn in figs. 3 and 7, which completes the doubling of the wire, into the form of fig. 1.

8thly, The lever 8, rising, lifts the ends of the wire, and the legs being kept down by the shoulders of *s*, gives them the knee bend; the manner of this is shewn by the dotted lines in fig. 5, though neither the plyers or lever 8 are there in the proper situation to effect this part of the process.

9thly, All the cams, except 1, cease their respective actions at once, and the finished wire drops out of the plyers; thus the cam 4 has, in the interim of the other operation, passed by, and suffered the blade *g*, of the plyers, to return by the action of its spiral spring 6; the cam of the rod *l*, and lever *k* 1, opens the side-benders; the cam 9 passes by, and permits the return of the plyers by the spring 17, fig. 5; but when the tail, 18, of the blade *q*, meets its stop screw 16, *q* returns no farther; but the front blade *r*, continues to advance towards the axis, by its spring 19, as fast as the cam 9 suffers it; this opens the plyers, and the wire falls out. The notch of the cam 1, now comes round, and suffers the roller D to descend on the wire, and advance another portion, which is treated in the same manner as the first.

These operations succeed each other with such rapidity when the machine is in action, that the handle may be turned at the rate of 150 turns per minute, without in the least injuring its operation; and the power required to

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turn it is so small, that one person might turn a dozen; or, if they were turned by a mill, he could attend a greater number, as they very seldom act wrong, or make a false wire.

The machine is capable of making wires of any size, by means of the following adjustments:

1st. The length of the notch in the cam 1, regulates the length of the wire which shall be cut off, because it is only as long as this notch is presented to the lifting tooth of the frame I, that the rollers act upon the wire; the screw 10 is adjusted to stop the wire when sufficiently advanced: but this is only a precaution to prevent any accidental protrusion after the cam 1 has lifted the roller. The cam 1, as before stated, is a circle; and, to have the means of adjusting the length of the notch in it, the cam is made of two equal circles, or wheels, fitted on the main axis, and applied to each other side by side, so as to make one; the beak of the frame I, which rests upon their circumference, is as broad as both circles together; each has a notch cut in it, much wider than the notch in the cam is ever intended to be.

Now, if these circles were twisted round on the axis, so as the notch in one circle was applied opposite to the complete part of the other, the cam would act as a complete circle, and the tooth of I, would never drop in the notch of either, because the circumference of the other circle holds it up at the time; on the other hand, by placing the two notches opposite to each other, the rollers would be suffered to act upon the wire longer than is ever intended; therefore, between these two extremes, the limits of the notch may always be determined by trial, that the proper length of wire shall be protruded; one circle making the beginning, and the other the end of the notch

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notch in the cam; both are fastened on the axis by clamp screws.

2nd. The centre screws, on which the whole of the plyers *r*, *r*, fig. 4, are suspended, admit of adjusting them, that their blades shall seize the wire by the middle, and make the ends of the staple equal when doubled.

3rd. The steel faces *t* and *s*, of the blade *r*, of the plyers, can be removed, and any other substituted; this regulates the distances between the legs and parts of the card wire, or the length of its shank.

4th. The screw *m* determines the degree of closure the side-benders shall have, and the square nut on the rod *l*, (which attaches to it the piece on which the cam operates,) determines the distance to which they will open; this is of consequence, for the wire, if bent too suddenly at once, into the dotted position, fig. 2, might be cut or broken, instead of being bent fairly.

5th. The screw which fixes the lever 8 into the main axis, admits the lever to be set further out, and then it will give a greater degree of knee bend; or, if nearer to the axis, will bend less, this is also influenced by the quantity of motion the cam *g* gives to the plyers, which can be adjusted, by sliding the curved arm 11, up or down the lever *r*, for which purpose its screws are fitted in grooves; this causes a more or less protuberant part of the curve 11, to meet the cam 9; the screw 16, as before stated, adjusts the blade *g* of the plyers.

The

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The GOLD MEDAL, *the Premium offered in Class* 137, *was this Session adjudged to* EDWARD SHEPPARD, *Esq. of Uley, in Gloucestershire, for producing, from his Flocks of* 1929 *Merino and Merino-Ryeland Sheep, in the year* 1811, 7749 *lbs. of Wool. The following Communications on the subject were received from him, and Samples of the Wool are preserved in the Society's Repository.*

SIR,

I SEND you, for inspection of the Society of Arts, &c. an account of the produce of 1929 Merino, and Merino-Ryeland sheep, the whole *bred* and kept by me, and shorn in the year 1811, and sold by me at the under prices, with specimens of the R, or *Rafinos*, wool, in its unwashed and washed state, of the yarn spun from the same, and of a superfine black cloth, and white milled kerseymere, manufactured wholly from that wool; the flocks kept in part at Uley, and part at Oxenton, in Gloucestershire.

Produce of 890 sheep, in the grease, not washed on the sheeps' back, sorted as under:—

(Uley Farm.)

In the Grease.

1892, 1st R, (or Rafinos.)
424, 2nd R.
828, F, (or Finos.)
401, T, (or Terceros.)
120, K, (or Kaibos.)

3665, being 4 lbs. 1 oz. per fleece.

Produce

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Produce of 1039 sheep, *washed on the sheeps' back*, sorted as under:—

(Oxenton Farm.)

154,	from fat wethers, not sorted.
2095,	1st R.
843,	2nd R.
378,	F.
270,	T.
188,	K.
54,	List.
84,	Beltings.
18,	Russett.
4084,	being 4 lbs. wanting 1 oz. per fleece.

It will be noticed, that there is very little difference in the weight of the fleeces, whether washed on the sheeps' back, or not; but it is to be observed, that the Uley flock, (of which the wool was in the grease,) consisted *wholly* of ewes, which produce smaller fleeces than the wethers, on the Oxenton farm. The wool of the ewe fleeces was considerably finer than that of the wethers.

I sold the above wool for 1552 *l.* 1 *s.*, as under:—

	£.	s.
3665 lbs. of wool, in the grease, at 4 *s.*	733	0
3930 lbs. of wool, washed on the sheeps' back, at 4 *s.* - - - -	819	1
£.	1552	1

EDWARD SHEPPARD.

Uley, Gloucestershire, March 5, 1812.

I take

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I take the liberty of annexing a few remarks on the subject of British Merino wools. I also enclose the necessary certificates, with a view to substantiate my claim, for the largest quantity and value of Merino wool, grown, sold, and manufactured, in the year 1811.

To C. Taylor, M.D. Sec.

Thoughts on the best state in which to produce the British Merino Wools for the Market.

Having had the experience of more than ten years, both in the growth and manufacture of British Merino wools, which, by the constant use of the Spanish rams that came into his Majesty's possession during that period, I have brought to very great perfection; I take this method of making public the result of my observations, as to the mode most profitable for the grower and manufacturer, to prepare the Merino wools for the market; as considerable difference of opinion and practice prevail on the subject.

I had the honor, in the year 1806, to present a memoir to the Board of Agriculture, in a successful claim I made, for the Gold Medal given for the greatest quantity of fine wool, grown within the year. I therein stated my opinion, that the principal cause of the superior and characteristic softness of the Saxon and Anglo-Merino wools, was, their remaining in their native grease, without its being expunged in the extreme degree practised in Spain. Excepting the moderate washing that Saxon and British wools receive on the sheeps' back before shearing, they

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they continue in their grease till they are worked up by the manufacturer; while the wools in Spain, as soon as shorn, are thoroughly scowered, by an injudicious process, and then exposed for days to a burning sun, in which brittle and hard state they are so closely packed up, that they come out of their bags here, almost as much pressed and hard as hops, wholly deprived of that unctuous preservative, which I conceive to be necessary to the soft feel of wool.

It has been thought by some, that Saxon and Anglo-Merino wools, have a softness peculiar to themselves, and different from the Spanish, their parent stock, obtained from their cross with another and coarser woolled sheep. I am, however, very much disposed to attribute the quality here spoken of, to the better management of the wools in this country. Unfortunately, we have no opportunities of discovering what Spanish wool would be preserved in the grease; as the mode of laying on the duties at Burgos, by the pound, prevents the grower or merchant exporting it in that condition. Otherwise, I am much inclined to think the same softness would be found in the pure parent fleece, as in the spurious offspring. From the small experience afforded by the ill-conditioned fleeces lately imported with the sheep from Spain, I am very much confirmed in my opinion.

Lambs' wool, not being so completely washed from its grease in Spain, as sheeps' wool, comes very near to the softness of the Saxon and British lambs' wool. As a proof of their possessing an extra quantity of grease, they are much sooner liable to breed the worm than Spanish sheeps' wool. I have often proved, in the manufacture of wool, that where it has been long saturated with

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with oil, artificially, the fibre has been lubricated by it, and the cloth very superior in feel and softness.

It has long been known to manufacturers and wool-staplers, that the wool of dead sheep, or Vell-wool, as it is called, is very harsh, and quite unlike the same wool shorn from the sheeps' back, occasioned by its being disengaged from the skin, by the fell-monger, by the action of lime, which entirely dries up and destroys the oily particles. May it not, in some measure, arise from the cause, that wool from sheep used to calcareous or silicious soils, is of a harsher description; as those from the Sussex, or Wiltshire downs, when compared with the fleeces grown on the argillaceous lands of Hereford and Shropshire? The absorption of the native grease, by the frequent contact of the sheeps' coat with the soil, and the dust from it, may help to remove that great preservative of softness, and leave the fibre exposed, unprotected by moisture, to the action both of the sun and rain, which, in those exposed situations, would act with double power.

From the above theory I would wish to deduce a few inferences, which may be of service in the growth and management of British fine wools. In the first place, I am satisfied that nothing can so much tend to preserve this necessary state of native grease, as the protecting the fleece from the humidity and inclemencies of climate. In a country where such exist in any great degree, it would be requisite, in *order to attain and preserve a superior degree of fineness*, that the sheep be housed in the winter, as practised in Saxony, and the northern parts of Germany, where they not only cot them in the winter, but drive them under cover at every thunder-storm in summer. The frequent washing of a sheep's coat, will very much

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much deprive it of its grease, as is evident from comparing the external part of the fleece with the internal. The same comparison will show how greatly such washing has impaired its fineness. The closeness of the coat of the *Spanish sheep*, compacted as it is, by its vast diffusion of grease, into almost a coat of mail, prevents the admission of the rain infinitely beyond that of any other sheep we know of; and accordingly protects the quality of the wool longer from deterioration. But even the Spanish fleece, by constant exposure to a humid climate, and to driving winds, and rains, will be penetrated, and every year become more open and hollow, and less tenacious of its native grease, and, in proportion, less fine.

My opinion, as to the best mode of preparing Merino wool for the market, is, that where a certain and ready sale offers, it should be left wholly in its native grease, without being washed on the sheeps' back. This further advantage attends it, that the fleece is much more captivating to the eye, and the fibre appears much more silky and fine. I fear, however, that there is not, at present, that quickness and certainty of sale, which will permit the grower to produce his wool in this condition. For if they have a chance of lying a long time in the grease, they will heat and be injured. I cannot therefore recommend it as a general practice, but I think where wools are likely to be used within six months of shearing, there can be no objection to keeping them in the full grease. I have, however, the satisfaction to state, that by the moderate degree of ablution, which takes place in washing the wool on the sheeps' back, the grease is not expunged in a degree to injure the softness of the fibre. The same mode is practised in Saxony, and is altogether different from the complete washing in hot and cold water,

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water, which the wool receives after being shorn in Spain.

The waste on British Merino wool, which has never *been washed on the sheeps' back*, is rather more than one half, or about 10 lbs. in 20, reckoning to its clean picked state. The same wool, *when washed on the sheeps' back*, loses with the manufacturer about one-third, or from 6 to 7 lbs. in 20, which is about the average of the waste of Saxon wool. Whereas, the best imported Spanish wools will not waste more than half that amount: viz. from 3 to 4 lbs. in 20. It is obvious, that a proportionate difference must be made in price, for the different conditions in which British Merino wools are produced; the manufacturer will be better able to estimate the probable waste of the wool that has been washed on the sheeps' back, as there is so much dirt, sand, and filth, generally with the wool in its genuine, unwashed state, that the waste must be always uncertain. I think, therefore, that wools washed on the sheeps' back will be the most merchantable.

I would also remark on the most preferable mode of managing the lambs' fleece, which I should recommend cutting, in preference to remaining on the lamb, till he becomes a yearling, as practised by many. The external part of the hog's fleece, which was the original lambs-wool, suffers most materially from the inclemency of the weather and the winter. In its state of lambs-wool it is beautifully soft, but being afterwards protruded from the new coat, it is in that condition exposed to the snows, winds, and rains of the winter, by which it becomes entirely deprived of its grease, and as coarse as the wool of our common country sheep. The deterioration of this exposed part of the fleece, in one season only, fully proves what

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what effect climate and weather have on the fibre of wool; it is therefore certainly desirable to shear the lambs, as in Spain; and although the covering may be more complete for the young sheep against the winter with the lambs coat on, yet the being rid of the incumbrance of a wet draggled fleece, in deep soils and bad weather, is of great advantage to the young and tender sheep.

EDWARD SHEPPARD.

Uley, Gloucestershire, March 5, 1812.

CERTIFICATES.

I DO hereby certify, that the Merino wool, bought of Edward Sheppard, Esq. by the house of Messrs. Sheppard, and Co. in the year 1811, was sorted, and produced as under; and that the same was worked up into superfine cloths and kerseymeres; and that the specimen marked 114,133, Imperial British, was taken from a cloth made from the R's of the said wool; and the specimen marked 114,660, from a kerseymere made from the same.

Wool in the Grease.

1892, 1st R.
424, 2nd R.
828, F.
401, T.
120, K.

3665

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Wool washed on the Sheeps' back.

2095, 1st R.
843, 2nd R.
378, F.
270, T.
188, K.
54, List.
84, Beltings.
18, Russett.

3930
154 in the grease, from fat wethers.

SAMUEL ROWLES,

Foreman to Messrs. Sheppard and Co.

March 7, 1812.

I DO hereby certify, that Messrs. Sheppard and Co. bought of Edward Sheppard, Esq. of Uley, in the year 1811, the under wools, at the prices stated:—

August 1st, 1811.

				£.	s.
3665 lbs.	Merino wool,	in grease,	at 4 s.	733	0
154	do.	do.	do. 3 s.	33	1
3930	do.	washed before,	4 s.	786	0
			£.	1552	1

For Sheppard and Co.

ROBERT TOMKINS.

Uley, March 6, 1812.

I DO

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I DO hereby certify, that the flock of Edward Sheppard, Esq. of Uley, Gloucestershire, in the year 1811, consisted of 1929 Merino and Merino-Ryeland sheep, bred by himself; of which 890 were kept on his farm at Uley, and 1039, at Oxenton, Gloucestershire; and that 3665 lbs. of wool, in the grease, were shorn from the former; and 4084 lbs. of wool, washed on the sheeps' backs, from the latter, excepting 154 lbs. which were cut from fat wethers.

WILLIAM CROUCH,
Bailiff to Mr. Sheppard.

March 6, 1812.

The GOLD MEDAL *or* FORTY GUINEAS, *at the Option of the Candidate, the Premium offered in Class* 146, *for the manufacture of Sail-Cloth proper for the use of the Royal Navy, and equal to the best Dutch, was this Session adjudged to Messrs.* ROBERT *and* GILES CAYME, *of Yeovil, in Somersetshire, who handsomely preferred the honorary Reward. The following Communication was received from them, and a whole Piece of the Sail Cloth placed in the Society's Repository. The Piece for which*

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the Premium was adjudged, is one of those called Double Canvas, 24½ inches wide, and 40 yards long.

SIR,

We have this day sent you three pieces of sail cloth, of our manufacture, to be presented to the Society of Arts, &c. for their inspection, which we hope will be approved of. We have annexed the process of the different stages of their manufacture.

We remain,

Sir,

Your obedient humble servants,

ROBERT & GILES CAYME.

Yeovil, March 12, 1812.

To C. Taylor, M. D. Sec.

Process for manufacturing Sail Cloth.

The two pieces of double canvas sent, were made of long flax, the warp of English, the weft of foreign growth, the spinning performed by hand, and grass bleached, in which process one-half of wood ashes, and one-half of pearl ashes, were used, except in the last bucking, when all pearl ash was employed; the warp of the

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the heaviest piece weighed thirty pounds, the weft twenty-one and a half; the warp of the other weighed twenty-eight pounds, the weft about twenty-three.

The piece thirty inches wide is made similar to the Dutch canvas, the warp of long flax, the weft of tow, spun by the hand, and bleached in the same manner as the former; the weight of the warp was twenty-two pounds, of the weft thirty-one and a half.

The two double pieces were wove by George Cooper, of East Chinnoch, Somerset, and are 24½ inches wide, and forty yards long; the thirty inch piece was wove by Charles Foot, of the same place.

Certificates.

A Certificate was received from Mr. William Cayme, of Yeovil, testifying, that the two pieces of sail cloth, sent to the Society of Arts, &c. were manufactured by Messrs. Robert and Giles Cayme; that he had examined them, and found them equal, in quality, to the best Dutch.

A Certificate was produced from Mr. John Cowpland, Sail Maker, Successor to the late Mr. Robert Jenkins, St. Catherine's-square, London, testifying, that he had examined the two whole pieces of canvas, called heavy double, manufactured by Messrs. Robert and Giles Cayme, of Yeovil, and that in his opinion they were, both in manufacture and materials, of the best quality that can be produced; and that he has had an experience of upwards of twenty-five years in the business, and is Sail-Maker to the Honorable the Board of Customs.

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That he has had the trial of Dutch canvas to a great extent, but that the pieces produced by Messrs. Caymes, are likely to be more durable and serviceable for wear, and are superior to any Dutch canvas he ever saw.

The Premium for making, in Great Britain, sail cloth equal to the Dutch, was first offered by the Society at the suggestion of the Earl of Dundonald, who, in the year 1806, proved to the office of Naval Revision, the defects of the sail cloth generally used in the Royal Navy. The Society of Arts, &c. in order to form a proper and accurate judgment of the subject, were favored, by directions of the Lords of the Admiralty, with many specimens of sail cloth from the Navy-Office, of the sorts generally used in the Royal Navy. The Society also procured specimens of the best Dutch sail cloth, from different places, and subjected the whole to a fair comparison with the sail cloth manufactured by Messrs. Caymes. The result of this examination was, in the opinion of Mr. Richardson, Mr. Hossack, and Mr. Cowpland, who are all conversant in this branch of business, that the canvas or sail-cloth made on this principle by Messrs. Caymes, is superior to the Dutch; that it is now advantageously employed for the Custom-House cutters, and greatly approved of; and that it is fit for every naval purpose where security is an object; that though it is higher in price in the first purchase, yet from its strength, durability, and not being liable to mildew, it is far preferable to any that is commonly used in the Royal Navy.

Specimens of the article rewarded have since been presented, by the Society, to the Admiralty and Navy Offices.

PAPERS

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PAPERS

IN

MECHANICS.

The GOLD MEDAL *of the Society was this Session voted to Mr.* MATTHEW COOKE, *No.* 10, *Winchester-row, Paddington, for his Invention of an Apparatus, by means of which Blind People can both learn and teach Music. The following Communication was received from him, an Explanatory Engraving is annexed, and a complete Apparatus is preserved in the Society's Repository.*

SIR,

I BEG leave to lay before the Society of Arts, &c. an apparatus which I have lately invented; also a brief explanation of the utility of this contrivance, called by me "The Blind Musician's Guide."

This

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This apparatus is for the purpose of instructing blind persons in the theory of music, and might, with propriety, be termed, *The Blind Musician's Book*, since it will enable all persons deprived of sight, to become acquainted (by their exquisite sense of feeling,) with every character in music, in less than a week's time, and as they progressively improve in the science, they will, with the assistance of a master, more easily acquire a perfect knowledge of music by this machine, than by any other hitherto invented.

In order to prove the truth of this assertion, let any professor of music examine and compare the new machine, with the wooden apparatus called the Peg Board at present used, and he will instantly perceive the superiority and simplicity of my invention. To speak in general terms of the utility of the new machine, I wish to observe,—

1st. That it displays, at one view, every character in the science of music.

2dly. The introduction of numeral figures is, of itself, of the utmost importance; as for example, when a figure is placed over any note, the blind person will instantly know what particular finger is to be put on the key of the piano-forte, or organ; which improvement alone is of an incalculable advantage. For blind persons, *in general*, finger the keys in a very unskilful manner, which is *one cause* of there being, at present, so many unsatisfactory performers. The great utility of numeral figures, also, appear in performing thorough bass, where the introduction of figures form the ground-work of that admirable system, and it becomes absolutely necessary for the practitioner

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titioner to understand, as he will then be enabled to know, from what source the laws of harmony are derived, for without the knowledge and constant use of figures, no person whatever can properly execute on the piano-forte or organ, either a common psalm tune, hymn, or even the most trivial song in a skilful or scientific manner.

The subjoined specimen on the cushion, exhibits a psalm-tune properly figured, and is intended as an illustration of thorough bass. The notes might be also figured, to shew that a particular finger must be put on the identical key of the piano-forte, to which the figured note would allude. By this method, the blind musician would readily acquire a good habit of fingering, and at length would surmount the most difficult passages with ease and freedom.

When the blind pupil hath gained a competent knowledge of thorough bass, the last grand object is the attainment of the exquisite science of composition, for which purpose the machine can exhibit a complete score of the treble cliff, the alto cliff, the tenor cliff; each displayed in their respective order and situation. These will afford the blind student a great scope for study, application, and invention; and under a skilful master he will, by the assistance of this machine, become in due time an honour to his profession while living, and his compositions may benefit posterity after his decease.

3dly. By the aid of this apparatus, any musical professor can instruct a blind person in the science of music; also, in like manner, a blind professor, who may be in the habit of using this machine, can convey instruction not only to a pupil who is blessed with sight, but likewise to the blind.

4thly.

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4thly. As the various characters in music are known, (generally speaking,) throughout the world, so the new apparatus will be found essentially useful to all blind professors in whatever part of the globe they may reside, and as they are made of brass, they will endure any conveyance, either by sea or land, without injury, or being liable to be out of repair.

5thly. The method of using the different characters is, to put one of the drawers or the boxes on a table to the right hand of the machine, and the other box on the left hand; the blind pupil will then select the various characters he wants, and prick them on the cushion, in the same manner as a compositor arranges his different letters for printing; when the scholar is perfect in his lesson, he may then return each character to its proper place in the drawer, until another lesson is wanted; when he is tolerably expert at this practice, he will be able to fill his cushion with any kind of lesson in about one hour's time.

6thly. The present mode of instructing blind persons in the theory of music, consists in the use of a wooden apparatus or frame-board, perforated with a number of holes, and those holes are filled by moveable pegs, the heads of which are cut into different shapes and forms, to give an idea of musical characters; but this system has been found very intricate and perplexing; this machine is also very limited in its operations, it contains about 600 different pieces, and the variety of its characters are in number 18 only; whereas the new apparatus contains 941 pieces, and the variety of its characters amount to 71. The new machine may be packed in a case 3 feet long, 1 foot 3 inches wide,

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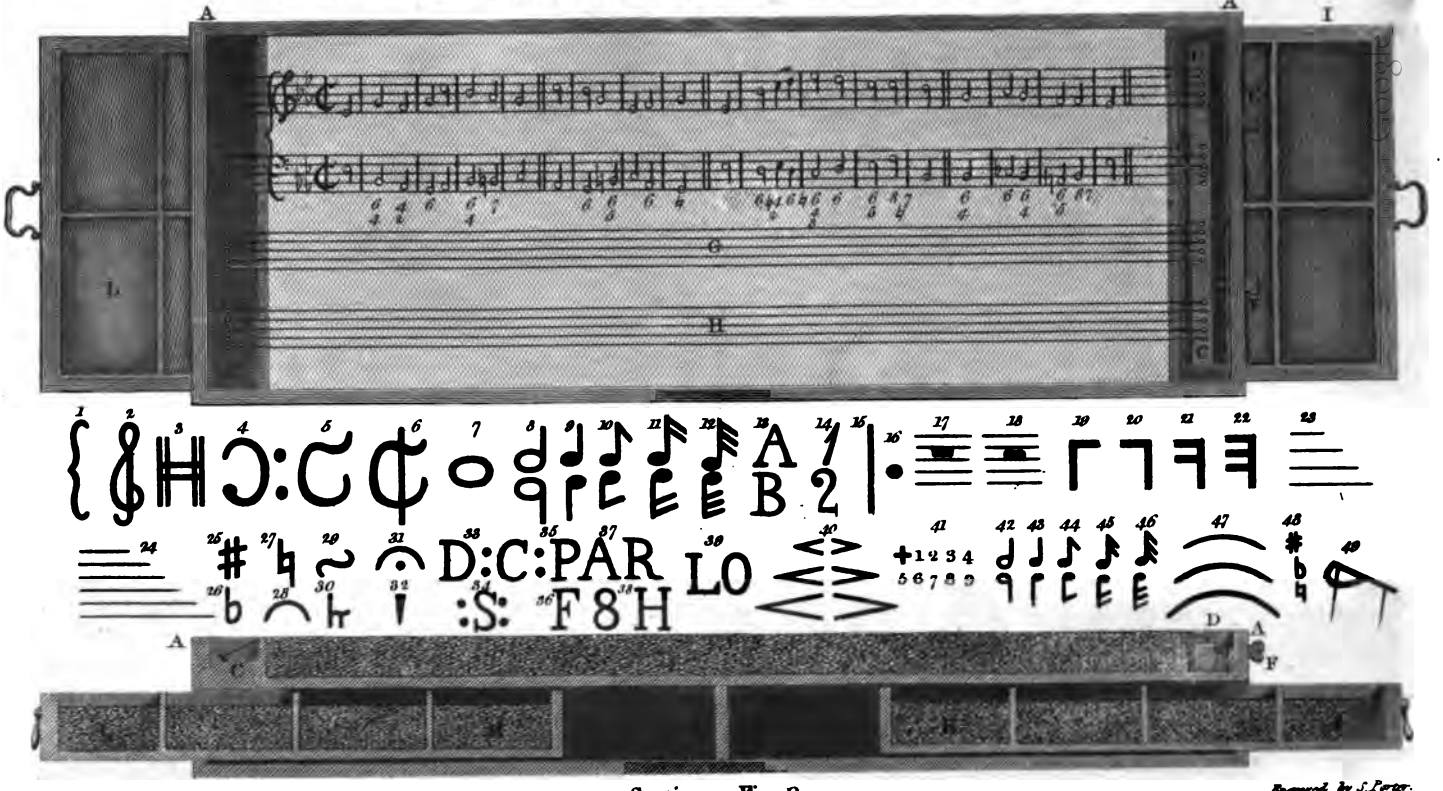
Mr. Cooke's Machine to teach Blind Persons Music.



Section. Fig. 2.

Engraved by S. Porter.

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wide, and 4½ inches in depth, the price thereof is 21 *l.*—Invented by,

MATTHEW COOKE,

Organist of St. George's Church, Bloomsbury.

No. 10, *Winchester Row, Paddington, London, May* 24, 1812.

To C. TAYLOR, M. D. SEC.

Reference to the Engraving of Mr. COOKE'S *Apparatus for teaching Blind Persons Music. Pl.* 3.

A A shows the surface of the cushion on which the different sets of 5 wires or lines are placed, ready to receive the brass musical characters.

C C C C, the pins on which the four sets of 5 wires are strung.

D, the bar by which a proper tension is given to the strings above-mentioned, by means of the two screws E F.

G H, two blank sets of 5 lines left ready for another tune, the two sets of top lines having a tune placed at present on them.

I, shows one of the drawers which contain the stock of brass musical characters, stuck on cushions ready for use. L is a drawer on the opposite side for the same purpose, both these are shewn partly open.

K M, fig. 2, show the further parts of the same drawers, and the divisions for containing the different characters.

The musical characters are necessarily made without the usual

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usual fine lines for strength, and have each two pointed wire pins screwed underneath them, one a little longer than the other, as shewn in the character marked 49, which points when pricked into the cushion and upon the lines, retain the character in its place.

The characters are made of sheet brass, cut out by means of proper tools in a fly press.

Reference to the Musical Characters on the Engraving, Plate 3.

No. 1. A Brace.
2. The Treble Cliff.
3. The Tenor Cliff.
4. The Bass Cliff.
5. The mark of Common Time.
6. A Breve Time.
7. A Semibreve.
8. Minims, with their tails in two different directions.
9. Crotchets with their tails.
10. Quavers with ditto.
11. Semiquavers with ditto.
12. Demi-semiquavers with ditto.
13. A specimen of letters for beginners.
14. A specimen of figures for divers kinds of time.
15. A Bar.
16. A Speck or dot.
17. A Semibreve Rest.
18. A Minim Rest.

19. A

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19. A Crotchet Rest.
20. A Quaver Rest.
21. A Semiquaver Rest,
22. A Demi-semiquaver Rest.
23. Tail Pieces, to correct Crotchets into Quavers, Semiquavers, and Demi-semiquavers, 4 sizes.
24. Ledger Lines, 6 sizes.
25. A Sharp.
26. A Flat.
27. A Natural.
28. A Tye or Bind.
29. A Turn.
30. A Shake.
31. A Pause.
32. Staccatto.
33. D : C : or Da.
34. ; S ; A Repeat, or Return.
35. P. Piano.
36. F. Forte.
37. A. R. Arpeggio.
38. 8 H. 8th higher.
39. L. O. Loco.
40. A Geometrical Rhombus < >, its use in music is, to encrease the sound, <, and to diminish it, > : 3 sizes.
41 The cross signifies the thumb, and the nine small figures are to mark certain passages in performing lessons, and also for thorough-bass.
42. Small Minims, for Appogiaturas
43. Small Crotchets, ditto.
44. Small Quavers, ditto.
45. Small Semiquavers, ditto.
46. Small Demi-semiquavers, ditto.

47. Large

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47. Large Tyes, or Ligatures, 3 sizes.
48. A small Sharp, Flat, and Natural, for Appogiaturas.
49. Represents a Minim in profile, exhibiting the method of affixing, (or screwing,) two pins to the same, previous to its being stuck on the cushion.

The large notes from No. 8 to No. 12, are about $\frac{3}{4}$ of an inch in length, and the small notes for Appogiaturas, from No. 42 to No. 46, are one-half of the former dimensions.

The GOLD MEDAL *of the Society was this Session voted to Mr.* THOMAS MACHELL, *Surgeon, Wolsingham, near Durham, for an Annular Saw, which can cut deeper than its own center. The following Communication was received from him, an Explanatory Engraving is annexed, and the Instrument is preserved in the Society's Repository.*

SIR,

I TAKE the liberty to solicit you to lay before the Society of Arts, &c. an instrument which I presume will facilitate several operations in surgery, and which I have named an annular saw. It is particularly well adapted for the division of cylindrical bones, surrounded by muscles, blood vessels or

or nerves, and with less injury to those parts than by any other instrument in present use.

In operations upon the cranium it has the superiority over the trephine, and Mr. Hay's saw, as it can be applied to the cranium in every form or posture, and remove any depressed portion of bone with the greatest safety and speed. Mr. Cline and Mr. Whatley have seen the instrument, and expressed their opinion that it would be found a very useful instrument in many operations.

My business as a surgeon, and pressing avocations in the country, prevent me from staying more than a few days in London. I should therefore esteem it an additional favor if the Society would soon take it into consideration, that I may personally explain its use.

The principle of this machine will be found useful for many mechanical as well as surgical purposes.

I am,

Sir,

Your humble servant,

THOMAS MACHELL.

London, March 24, 1812.

To C. Taylor, M. D. Sec.

Reference to the Engraving of Mr. Thomas Machell's *Annular Saw, which cuts beyond its own own center. Plate* 4, *Fig.* 1, 2, 3, 4, 5.

Fig. 1, is a view of the saw, its frame, and the wheelwork which actuate it; fig. 2, is an edge view of it; fig. 3, is

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3, is a view of part of the interior work, and figs. 4 and 5, a detached view and section of the saw itself.

In fig. 1, A B represents a solid arm or rod of iron, which supports the whole instrument; this rod is fitted up in such a manner, that it can be moved in any direction either to raise or lower it, to move it from right to left, or to lengthen it out endways, so that the joint B at the end of it can be placed in any possible situation within certain limits; this joint connects another piece D with A B, and at the end of this is a joint E, the motion of which is at right angles to the former joint, and it attaches the saw frame F G to it; this frame, see also fig. 2, contains a toothed wheel H, which is turned round by the handle I, and by its teeth actuates a smaller wheel concealed within the frame, but its dimensions are shown by the dotted circle described round the screw *a*, which is its center pin; this wheel turns another *b*, (see the section, fig. 3,) and this moves a third wheel *d*, which has a circle of 6 pins, *c* projecting from its face, and these turn round the saw K, by entering into notches made in its edge, so that it is actuated by its circumference instead of its axis, as is the case with the ordinary *circular* saws; its construction is explained by figs. 4 and 5, in which K is the ring or annular saw, the inside of the hole through it, being as shown in fig. 4, turned out concave, in the latter rather larger than the edges, somewhat like the rim of a spectacle frame; then the internal circle M being accurately fitted into it, is swelled or bulged out by means of a taper mandrell, driven into the hole in its centre to such a size that it will fill the outer ring or circle exactly, in the manner of fig. 4, and then it cannot get out of its place sideways, because the interior circle exactly fills the groove or hollow parts formed round within side the annular saw K, this

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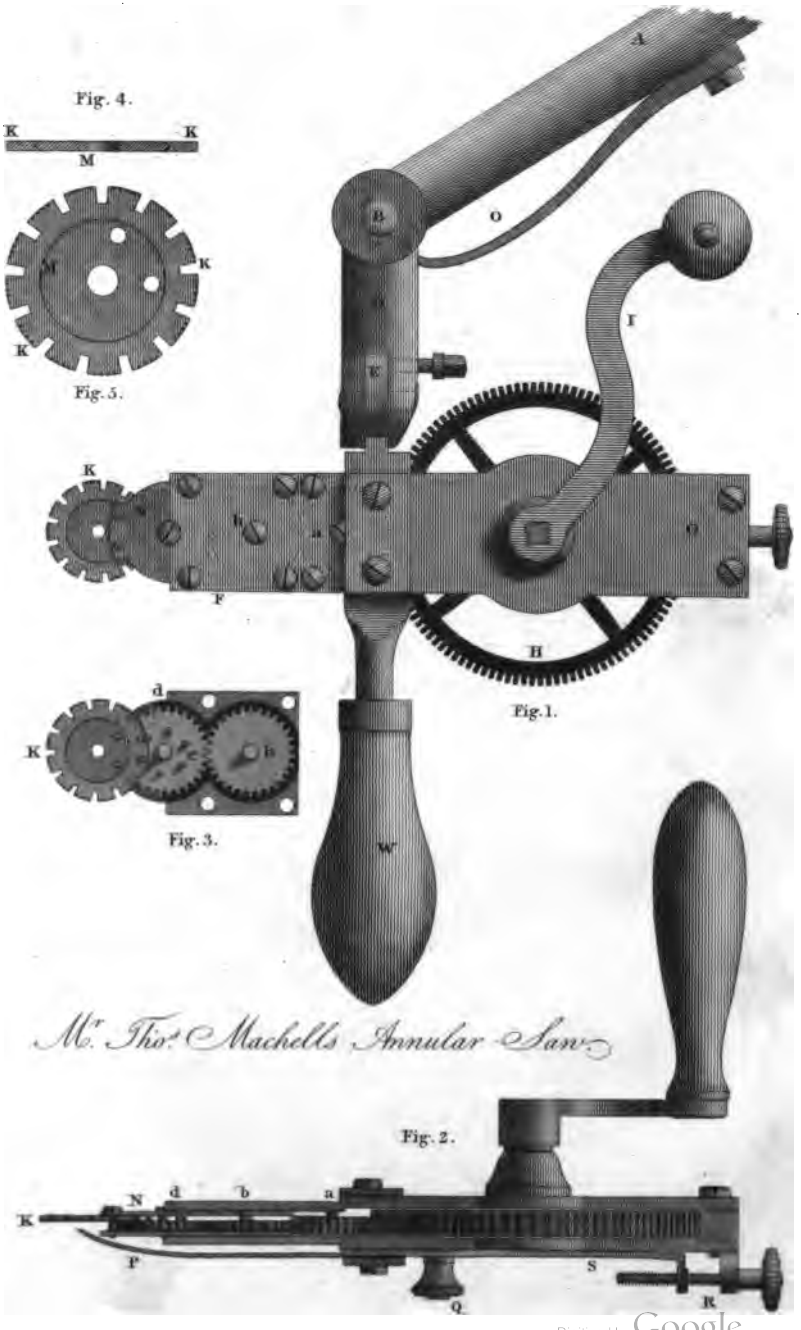

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Drawn by [illegible]

Engraved by [illegible]

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K, this internal circle M thus becomes the axis on which the saw turns. The circumference of the saw, as shown in fig. 5, is notched all round with fine teeth, which perform the cutting, and at intervals it is cut with deep notches, into which the pins on the face of the wheel *c* are received, and act upon the ring so as to turn it round; the interior ring M, or axis of the saw, is supported by being screwed to a piece of iron, N, which also carries the center pin of the wheel *d*, and is itself screwed to the inside of the brass plates F G of the frame, by the screws shown in figure 1, W is a handle to guide and direct the saw, moving it upon its several joints B and E into any required position; *o* is a spring which in certain positions balances the weight of the frame F G, &c. depending upon the joint B; P, fig. 2, is a gauge consisting of a flat slip of iron, P S, which is fitted to the underside of the frame; it has a groove formed in it through which a screw passes, and the nut Q will fasten it at any required point; it is moved sideways by the screw R, and adjusted to advance to any required distance towards the extreme end of the saw; its use is to regulate the depth to which the saw shall penetrate in cutting.

The very singular property of this annular or circular saw, in cutting deeper than its centre, renders it likely to prove of great utility in a variety of surgical and mechanical operations.

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TEN GUINEAS *were this Session voted to Mr.* WILLIAM BOWLER, *of Holborn Hill, for a Mechanical mode of destroying Rats and other Vermin. The following Communication was received from him, an Explanatory Engraving is annexed, and a Trap on this construction is preserved in the Society's Repository.*

SIR,

I BEG leave to lay before the Society of Arts, &c. a trap of my invention, made upon such a principle that it will catch any animal, however large or small, and retain it without any possibility of escape.

I remain,

Sir,

Your humble servant,

WILLIAM BOWLER.

November 5, 1811.

TO C. TAYLOR, M.D. SEC.

Reference to the Engraving of Mr. WILLIAM BOWLER'S *improved Trap for catching Vermin, &c. Plate* 5, *Fig.* 1, 2, 3.

A B C, fig. 1, plate 5, are three boards, forming the bottom and sides of the trap, the latter are united by a cross

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cross bar D, E and F are the two doors, moveable on their respective center pins *a b*, so that they will shut down and close the ends of the trap, as shown by the door F, or they may be set open in the manner shown by the door E; it is to be observed, that when the trap is set, both the doors are open, the figure being only drawn in this manner to explain both positions. The doors have a constant tendency to shut down, by the action of two strong springs of iron wire, which press beneath the tails or levers G H, so as to throw them up, and thereby close the doors as at F; these springs are shown separately in fig. 2; both springs are formed of one piece of wire, the two ends, I K, of which are fastened down to the cross bar D, as shown in fig. 1, by means of four wire staples between these, it is formed into two spiral parts L L, and also a crank part, the extremity M of which acts beneath the tails G H of the doors; the catches which hold the doors open are a wire P, which is linked to a staple at *m*, and the other end of which is connected with a wire N, which, as shown in fig. 3, has a tail *p* projecting from it behind, the end of which is hitched under a wire pin or staple, fixed into the side of the trap; now it is plain that this crooked wire by means of its tail, becomes a bent lever, and if the lower end of it be retained from flying sideways from the trap, it will hold down the wire P, and thus hold the two doors of the trap open by confining their tails G H, and in order to do this, the end of the wire N is made tapering, and is retained by means of a small round wire hook *o*, also made tapering, which passing through the side of the box, forms one of the pivots of the moveable board R, within the trap, and the smallest pressure on either end of this board will turn it so far, that the hook *o* will slip beside the tapering end of the

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wire N, and suffer the springs to rise and shut down the doors of the trap; the springs are prevented from flying too far out by pins fixed into the tails of the doors, one of which is shown at M, fig. 2.

The SILVER MEDAL *and* FIFTEEN GUINEAS, *were this Session voted to Mr.* THOMAS PERRY, *of Farnham, in Surry, for his Invention of a Chirographagist, or Instrument intended to form the Hand in Writing, so as to manage the Pen with correctness. The following Communication was received from him, an Explanatory Engraving is annexed, and the Instrument and specimen of Writing executed therewith, are preserved in the Society's Repository.*

SIR,

I HAVE been induced to trouble you with this note, accompanied with a Chirographagist, from a thorough conviction of its great utility in teaching the art of writing, as it obliges the pupils to sit properly, and effectually prevents them from pressing the stomach or chest against the desk; were this the only recommendation, it may be desirable as a preservative of health, it being a well known fact, that asthmas and consumptions are frequently increased by the pressure of the chest to persons who write much. By this instrument the hand and pen are confined in their proper positions, by which means

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means correctness and freedom in the art is more easily attained, and in much less time than without such assistance; the head is also prevented from being too much inclined forward.

I am,

Sir,

Your obedient humble servant,

THOMAS PERRY.

Commercial Academy, Farnham, Surry, Oct. 8, 1811.

To C. Taylor, M.D. Sec.

SIR,

As I have from extensive practice experienced very great advantages from the use of this machine, I am anxious that it should become generally serviceable in schools; the greatest difficulty which masters meet with in teaching writing, is that of making their pupils hold their pens properly. I have therefore taken the liberty of troubling you with an instrument of my invention for effecting this purpose, should you think it worthy your notice, to submit it to the Society of Arts, which will be conferring a great obligation on me. During these last eight years, more than three hundred pupils have been taught in my own school, who have invariably made use of it; a letter is enclosed written by a child six years of age not intended for inspection, who was taught by this

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instrument. The present letter is also written by one of my pupils with the instrument on his hand, aged 14, viz.

HENRY LEGGATT, Pupil.

Signed and approved by,

JOHN ROBERT SCOTT, D. D.
WILLIAM P. JONES, A. B.
THOMAS THATCHER.

To C. TAYLOR, M. D. SEC.

Reference to the Engraving of Mr. THOMAS PERRY'S *Chirographagist. Plate 5, Fig. 4.*

THIS figure represents a child with the instrument in use; it consists of five pieces of wood fitted together, the principal of which, marked *A*, is a small flat board of mahogany, lying flat upon the table, and the child's wrist is confined down in a concavity upon it, by a piece of wood F, which is likewise concave, and is united to the piece A by two little straps and buckles, in this an upright piece B is mortised, and an horizontal piece E slides up and down upon it, so that it can be fixed at any height by a thumb screw *a*; in the under surface of the bottom board A, a dove-tailed groove is made, in which the piece G is fitted, and can be slided in and out to any required length, it is not fixed at right angles to the piece A, but inclined thereto in such an angle as is suitable to the hand in writing.

The method of using the Chirographagist, is, to put the hand between the concave boards A F, at almost two inches

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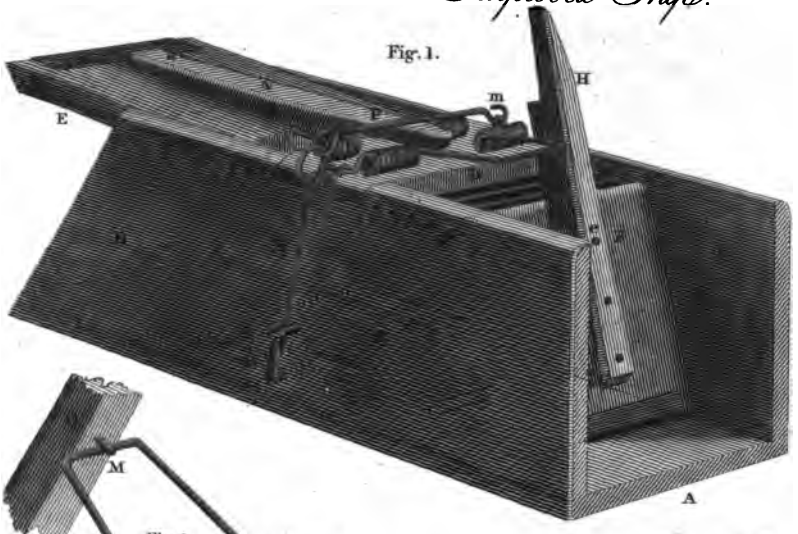
Mr. Wm. Bowler's Improved Trap.

Fig. 1.



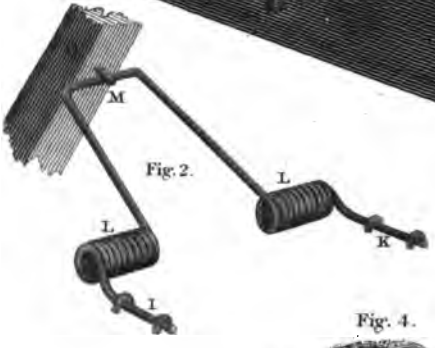


Fig. 2.

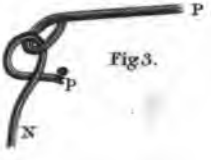
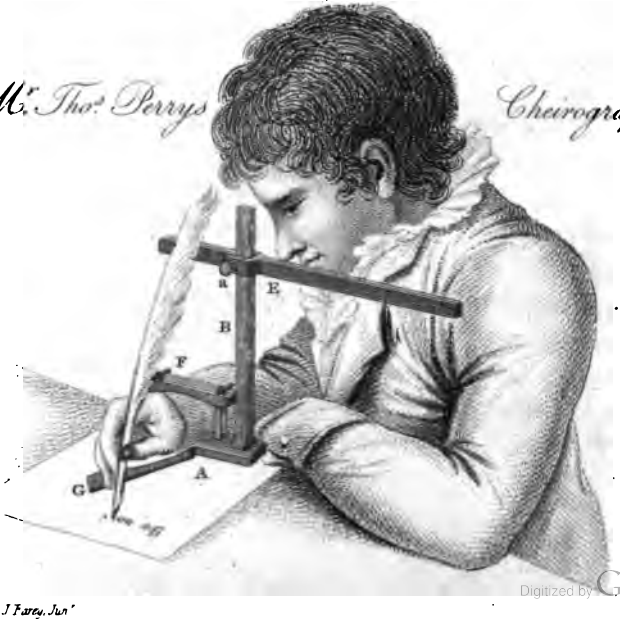


Fig. 3.

Fig. 4.

Mr. Thos. Perrys Cheirographagist.



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Drawn by J. Farey, Jun.

Engraved by S. Porter.

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inches above the wrist, and place the little finger *over*, not upon, the sliding stick *a*, which is to be moved according to the size of the hand, so that the tip of the little finger may be near the end of the stick; the cross bar E, which is to come under the chin of the pupil, is to be screwed on the perpendicular bar B, and the machine be fastened with the straps, only tight enough to prevent the hand turning round.

The SILVER MEDAL *and* FIFTEEN GUINEAS, *were this Session voted to Mr.* J. GOSS, *of Enfield, for a Mechanical Instrument to work Addition of Numbers with accuracy and dispatch. The following Communication was received from him, an Explanatory Engraving is annexed, and the Instrument preserved in the Society's Repository.*

SIR,

ABOUT two years ago I resided at Hatherleigh in Devonshire, where I had a day-school, and lodged with people who kept a shop, they had frequent occasion to cast up bills, but having but little knowledge of figures were very liable to make mistakes; they, therefore, when a bill was any way long, generally brought it to me, and oftentimes, when I have been out in the town,

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I have been sent for to come home and cast up a bill; at length I thought if some mechanical contrivance could be invented to cast up bills, it would be of great service to many, or even to all who are in business. I knew that multiplication, division, and many other rules in arithmetic, were often worked mechanically, but addition being in itself so irregular, I was afraid no instrument could be invented to work it. However, by repeatedly considering the subject, I discovered after sometime a method of casting up a bill by a slide rule about two feet long and two inches broad; and as I was studying to bring it to greater perfection, an imperfect idea of this addition-wheel sprung up in my mind, which is a much better method than the former, but thinking the experiment would be attended with expense, and after all perhaps be of no advantage to me, it lay dormant in my mind till about last Michaelmas, at which time I came to London, and a friend of mine got me one of the lists of Premiums offered by the Society of Arts, &c. published in the year 1809. After I had read of those honorary and pecuniary rewards which had been given, and were then offered, my desire to obtain some mark of the Society's approbation could not be appeased but by possession, and I was determined to carry my idea into execution; I immediately renewed my study of this instrument with encreased application.

Casting up bills is what falls to the lot of most people in business, and many who are moderately clever at it, often find it a troublesome task before they can place any dependence on their being right; they have need to cast them up two or three times, and even then have often as many different sums, and therefore frequently find themselves much confused and puzzled in the operation; the instrument of my invention in such cases would be very acceptable,

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able, it would take the work from the *mind*, and give it to the *hand*, which would perform it with greater ease, accuracy, and expedition; a person who can only *read* figures, may by this help add up a bill with as much accuracy as a mathematician.

The same day I completed my instrument, I showed it to the people with whom I lodged, who as I have already observed were shop-keepers. I wrote a bill, and desired them to cast it up; I then showed them how to do it by my wheel, and desired them to add up the same bill by it, and see if it was right. They then proceeded, and cast it up right by the wheel, when they discovered that they had made a mistake of one shilling in the row of pence, and two shillings in the row of shillings. They were therefore much pleased with my new contrivance, because it was more true and less troublesome than the common way.

This wheel has four circular rows of figures upon its face. The first row which is nearest the teeth on the circumference, denotes *pence*, the second *shillings*, and the third and fourth denote the *total number of pence or shillings*, &c. Thus, if 64 in the third row should be under the index, if I were casting up pence, I should see in the first row, 4 under or next before the index, and the next red figure passed over by the index would be 5, which signify 5*s.* 4*d.*, the red figure or figures nearest the index signifying *shillings*, and the black figure or figures before the index the odd pence. In the second row, the black figure before the index signifies the number of odd shillings, and the next red figure the number of pounds. Before I begin to work, the red figures 360, 180, 9, 15, must always be placed next before the index, I then begin

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gin to cast up the row of pence. If I should have 5*s.* 4*d.* I set down the 4*d.* under the bill, and bring back the red figures 360, &c. again before the index; then, with the brass handle I move round the wheel 5 divisions, and go on with the row of shillings, &c.

This addition-wheel has cost me much time and thought, but should it be honoured with the approbation of the Society, I shall feel myself much gratified.

I am,

Sir,

Your humble servant,

J. GOSS.

No. 4, Wood Street, Spa-fields,
Jan. 21, 1812.

To C. Taylor, M. D. Sec.

DEAR SIR,

The bearer, Mr. John Goss, of No. 4, Wood Street, Spa-fields, has invented an instrument to work addition, both simple and compound, with unerring accuracy, and as it is quite mechanical, it may be worked by any person who can read figures, and will I conceive, be of use to people in business who are pressed for time.

Mr. Goss will explain it to you, and if you think it will be useful to the public, I will thank you to give him an opportunity of laying it before the Society of Arts, at your earliest convenience, that they may judge of

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of the merit of the instrument, and confer on Mr. Goss such reward as they shall think proper.

I remain,

Dear Sir,

Your obedient servant,

JAMES ASPINALL.

Quality-court, Chancery-lane,
Jan. 18, 1812.

To C. Taylor, M. D. Sec.

Reference to the Engraving of Mr. J. Goss's *Instrument to work the Addition of Numbers in Arithmetic. Plate* 6, *Fig.* 1, 2, 3, 4.

This instrument consists of a brass hoop, fixed to a flat circular plane of wood; this hoop is divided on its upper edge into 180 ratchet or saw-like teeth, and the circle has a number of radii lines of figures upon its face, in divisions corresponding with the teeth; also of a supporting circle, having a fixed index reaching across those lines of figures; and a circular row of 20 divisions, and another of 50, correspondent to the ratchet teeth; and of a brass central index which takes into the teeth, and will turn the ring in one direction only, to one certain place or stop; and then, the numbers on the circle, close to the fixed index, will show the sum total of the different numbers to which it has been turned round, at any number of intervals. Fig. 1, is a plan, showing a portion of the moveable hoop and circle, and the numbers which are upon

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upon its face. Fig. 2, is a section of the instrument, answering to the same. Fig. 3, is a plan, on a smaller scale, of the instrument on the under side; and fig. 4, an edge view corresponding with it; the same letters of reference are used in all the figures. A A, represents the principal upper or moveable circle, on which some of the numbers are marked, this is attached by a centre pin R, to another circle B B, figs. 2, 3, and 4, which is held in the hand when the instrument is used; these two circles turn round freely upon each other, and upon the centre of the upper one, a radial lever, or index, C L, is fixed, which has a free motion round the centre pin R. The circle A A, has a ring or hoop of brass M M, fixed round its circumference, which is cut into 180 serrated teeth, as shown in fig. 2. The centre index C L, slips over the sloping side of these teeth when moved in one direction, but when moved in the other, its edge *c* catches into the perpendicular sides of the teeth, and carries the circle round with it. E E, fig. 3, are two brass cocks, screwed to the side of the lower circle B B, and projecting from it beyond the circumference M, of the upper circle, the ends of them support a flat circular wooden or brass limb, F F, which (as shown in fig. 1) has other correspondent divisions and figures upon it, over which the index passes; at one end of the limb, a wire stop, *b*, is fixed, and when the index is pressed against this, its edge *c* will stand upon the figure 1, of the limb F F, which is numbered on progressively, 1, 2, 3, 4, 5, 6, &c. to 50; which numbers are the same distance apart as the teeth upon the edge of the great circle *A*, so that by moving the index to any of these numbers, its edge C will have passed over the same number of teeth of the circle, as the number of the limb which it is carried to denotes; but in passing in that

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Mr. Goss's Instrument to perform Addition.

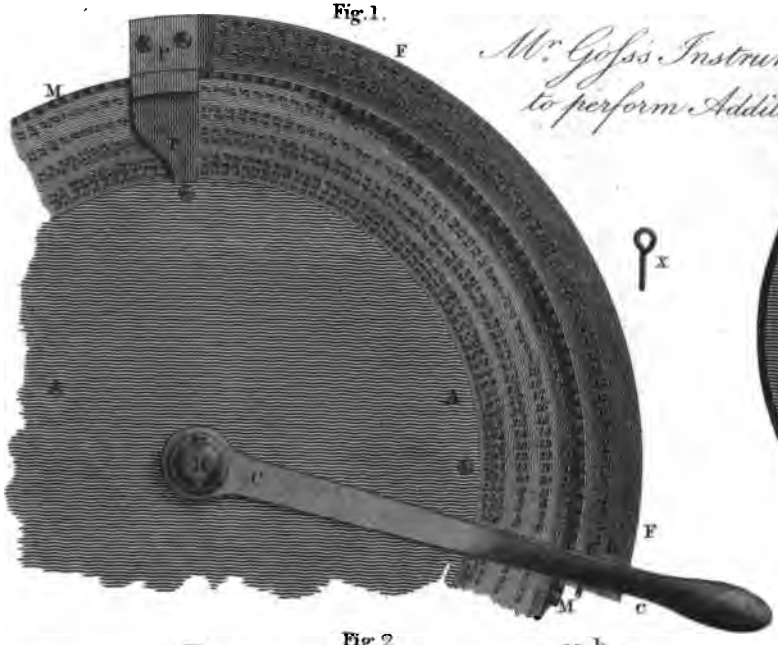

Fig. 1.

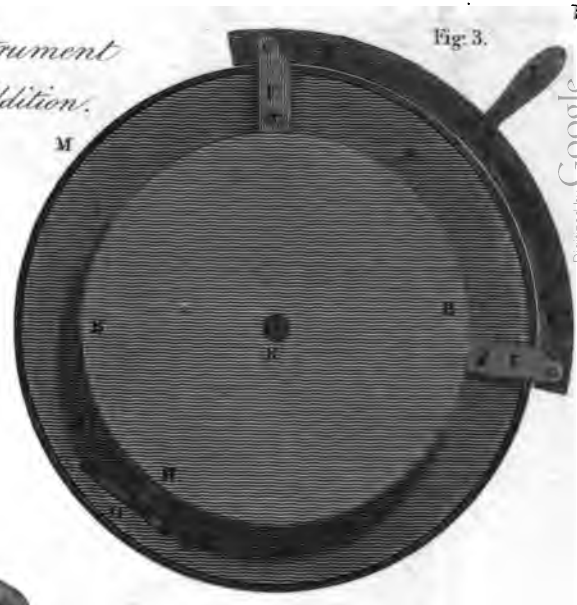

Fig. 3.

Fig. 2.

Fig. 4.

Drawn by J. Farey.

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that direction it slips over the sloping edges of the teeth without moving the circle; now, the edge C having arrived at any intended number, as 19, for instance, the edge of the lever is pressed into the teeth, and being brought back again, till it touches the stop *b*, it will have moved the circle A round 19 teeth. At the extreme end of the limb F F, a piece of brass, P P, is fixed, so as to form a reading-index for the numbers on the several circles, which are described on the face of the great circle A A, these are four in number, viz. one for the pence, one for the shillings, and two circles for the pounds, the external circle, which is the pence, is numbered 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, then 1, marked in red, to denote 1 shilling*: then 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, again, and 2, in red, to denote 2 shillings, and so on, up to 180, which will be 15 shillings; the next circle towards the centre is for the pounds, this is numbered 1, 2, 3, 4, 5, 6, &c. up to 19, then one, in red, for one pound: then 19 numbered successively again, and 2, in red, for two pounds, and so on till 9 pounds, which fills the circle, because 9 pounds contain 180 shillings; the third circle towards the centre is for the addition of pounds, or any other whole numbers; the circle therefore is numbered in regular ascending series, from 1 to 180; but to enable the instrument to count higher than 180, the fourth circle is introduced, this begins at 181, and proceeds, by a regular increase, to 360; G, figs. 3 and 4, is a detent, moveable on a centre pin attached by a stud H, to the lower circle B B, and its tail is pressed by a small spring *h*, which causes it to press constantly upon the under side of the

* Those figures, which in the instrument are marked in *red*, the engraver has distinguished, by including them in a small circle.

great

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great circle A, A; and produces such a friction as prevents the upper circle slipping loosely round; a screw *k*, fig. 3, is fixed in one part of the under side of the lower circle, so that in turning round, it interceps the detent G, and in this position the edge of the index P P, is at the zero, or point of commencement of all the numbered circles. In this position the instrument is ready for use, in the following manner: suppose the following sum is to be added up,

£.	s.	d.
23	14	3
18	5	2
12	3	4
47	6	5
21	4	3
12	3	4
134	16	9

Having adjusted the instrument as before-described, that is, having brought the circle to the zero, hold the circle B, B, in the one hand, and take the end L, of the lever C L, in the other, then move the end of the lever C L, till its edge *c*, cuts the figure 4 of the limb F F, which is the first figure in the sum; in this movement the index is held up so as not to touch the teeth, but having arrived at the intended figure, it is pressed down, into the teeth, and is brought back again (the circle with it) until it touches the stop *b*, when it will have moved the circle, so that 4 stands before the index P, on the pence circle; then the index L is carried back again to 3, the second figure of the sum, and returned to its stop, carrying with it three divisions more; it is next moved to 5, and

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5, and so on, following the pence column, till the number 3, at the top, is counted; then, examining at the edge of the index P P, it will be found to stand at 9, in the pence circle, and the nearest red figure which has passed by the index, will be 1, denoting 1 shilling and 9 pence, therefore 9 must be put down, and 1 carried to the next column; and to recollect this, a small pin, *x*, must be stuck into the hole, No. 1, upon the outside of the limb F; the circle is then returned to the zero, which is readily performed, by turning it backwards as far as it will go, and the stop *k*, fig. 3, prevents its going farther than the right position; the column of shillings is then added up by the same process, taking the numbers 3, 4, 6, 3, 5, 14, by successive steps of the index L; then, on examination of the second, or shillings column, 16 will be found beneath the index, and the nearest red figure which it has passed by will be 1, denoting 1 pound 16 shillings; 16 therefore is set down, and the pin *x* still kept in the same hole to denote that one is carried forwards, the circle is again brought to the zero, by bringing it back as far as it will go; and lastly, the column of pounds is added, in exactly the same manner.

The

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The SILVER MEDAL *was this Session voted to Mr.* JOSEPH DAVIS, *of Catharine-street, Strand, for his Invention of a temporary Scaffold, by means of which the outside Walls of Houses may be repaired, or beautified, with equal safety, and at a less expense than usual. The following Communication was received from him, an Explanatory Engraving is annexed, and a Model of the Apparatus is preserved in the Society's Repository.*

SIR,

HAVING to repair and beautify the front of my house, which is called the Minor-Theatre, in Catharine-street, Strand, I invented a machine which answers for such purposes much better than a scaffold, and saves considerable expense. As I conceive this contrivance may be beneficial to the public, I should be happy to submit a model thereof to the Society of Arts, &c. for their inspection.

My machine is twenty-six feet long, and cost me two pounds ten shillings, and when no longer wanted for this purpose, the timber is worth two pounds. A single machine may be made thirty-six feet long, and united to any length, and when not in use, may be folded up and put by as a common ladder.

On this plan of a scaffold, there is no occasion to break

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break up the pavement, or to give the least interruption to passengers in the street.

I am, Sir,

Your most humble servant,

JOSEPH DAVIS.

Catharine-street, April 14, 1812.

To C. Taylor, M. D. Sec.

Certificates.

Certificates were produced from Henry Hawbridge, builder; William Blacklock, painter; G. Fry, plasterer, and John Rochley, carpenter; stating, that they were workmen employed by Mr. Joseph Davis, at the front of his house, in Catharine-street, and testifying, that his machine is superior to any scaffold they ever worked upon.

Reference to the Engraving of Mr. Joseph Davis's *temporary Scaffold for repairing the outsides of Houses. Plate* 7, *fig.* 1.

This simple and effective contrivance, consists of nothing more than a couple of planks, A, to which two others, B B, are nailed, forming a sort of trough, or moveable scaffold, on which the workmen stand; which is suspended at any height at pleasure. C C, D D, are two frames of wood, in which the trough or scaffold is

 fixed;

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fixed; in the top cross-pieces of these frames, two pullies, E and F, are fitted, and round these the ropes by which the scaffold is suspended are passed; the ends, *a a*, of these ropes, are made fast to two beams, or scaffold poles, G and H, which project out of the upper windows: or they may be fixed over the parapet, or by any other means, as is thought proper; two single pulley blocks, *gg*, are also suspended from these poles, and the rope, after passing under the pullies, E and F, passes over the pullies in these two blocks, and the ropes or falls, *h* and *i*, come down to the machine, and are made fast to any convenient part of it; therefore, by drawing these ropes, the workmen can, with the greatest ease, raise or depress the suspended scaffold to any place where it is wanted for work.

TEN GUINEAS *were this Session voted to* JOSEPH MARTIN, *No.* 176, *Fleet Street, for Method of relieving a Horse fallen down in Shafts of a loaded Cart. The following Communication was received from him, and Illuminatory Engraving is annexed, and a Model preserved in the Society's Repository.*

SIR,

I BEG you will do me the honor to inform the Society of Arts, &c. that I have just now completed an invention

Mr. J. Davis's temporary Scaffold for Painters, &c.

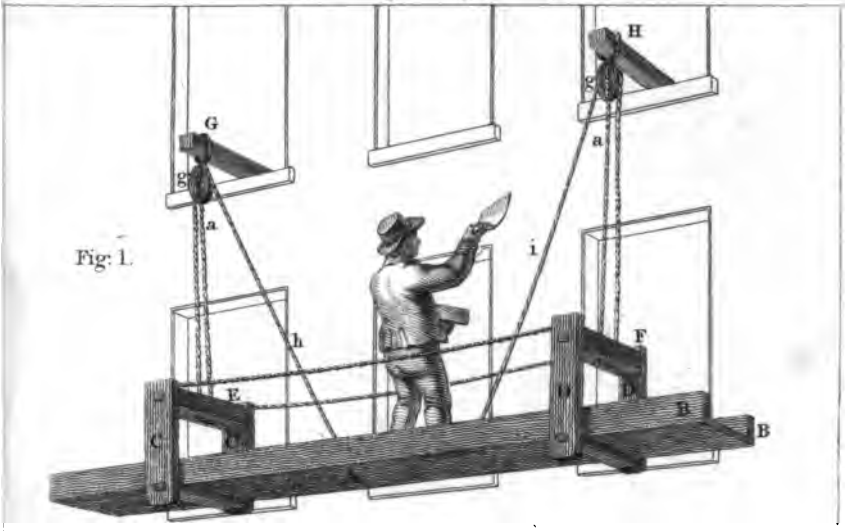
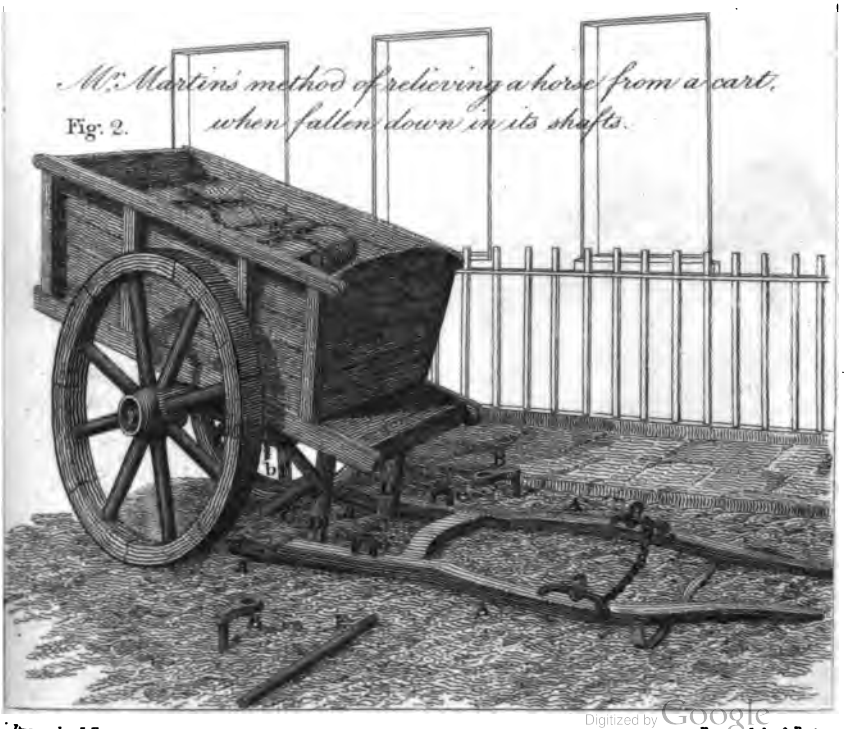


Fig: 1.

Mr. Martin's method of relieving a horse from a cart, when fallen down in its shafts.

Fig: 2.



Drawn by J. Parry.

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Engraved by S. Porter

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to relieve horses when they fall down in the shafts of a heavy loaded cart or carriage, and I will wait upon the Society with a model for inspection whenever they will please to appoint.

Believe me to be,

Sir,

Your most obedient servant,

JOSEPH MARTIN.

176, *Fleet Street, Feb.* 19, 1812.

To C. Taylor, M. D. Sec.

Reference to the Engraving of Mr. Joseph Martin's *Method of relieving a Horse when fallen down in the Shafts of a Loaded Cart. Plate* 7. *Fig.* 2.

Figure 2, of plate 7, represents a cart, in which the horse having fallen, has been relieved by detaching the shafts from the cart, which is provided with temporary legs or stays, D D, to support the weight of the front part, and prevent its falling any lower until other means can be resorted to for raising it again.

The figure represents a common cart, A A represent the shafts detached and lying on the ground; the connection is formed with the cart in use by two screw-bolts, one of which is seen at *b*, passing through the bed of the cart, and also through the iron hinges *a a*, by which the shafts are united to the cart; besides these screw-bolts two steady

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pins, or bolts without heads, also pass through holes in the shank of each of the hinges, and two nuts, B B, are screwed on to fasten them when the cart is in use; but if the horse falls down, so that the weight of the cart comes to rest upon the fore-ends of the shafts, he is confined between them by the weight, and prevented from rising. Mr. Martin's method of relieving a horse in such a situation is thus effected. The locking bar E, is first removed from the staples *e e* of the shafts, with which the body of this, like most other carts, is provided, for the purpose of turning up and discharging its contents; this being done, a man must creep under the cart from behind, and first put down the legs or stays D D, which were before turned up out of the way beneath the cart, then unscrewing the nuts B B, the shafts fall down, completely detached from the body of the cart, as represented in the figures; and nothing then prevents the horse from getting up, the cart remaining supported in front by the legs D D; C is an additional leg folded up beneath the cart, it is of such a length that it will, when set upright, support the cart in an horizontal position, and is used to support the cart when lifted up whilst the shafts are fixed on again; the legs D D are provided with iron hooks, one of which is seen at F, which retain them steadily in their places, when the weight of the cart tends to throw them forwards; the leg C is provided with a similar hook.

TEN

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TEN GUINEAS *were this Session voted to Mr.* J. KING, *No. 4, Mulberry Court, near the Bank, for an Improved Machine, to enable Shoe and Boot-Makers, to work without pressure upon the Breast or Stomach. The following Communication was received from him; an Explanatory Engraving is annexed, and the Machine is preserved in the Society's Repository.*

SIR,

I HAVE left herewith, a machine to enable shoe and boot-makers to work standing.

From the manner of its construction, the workman can with it hold his boot or shoe much steadier, and do the work readier and better than by any other method that I have seen.

The machines can be afforded for sale at seven shillings each. The machine can easily be fixed to a window by screws, or two or three holdfasts, with a strong foot to support the end to which the foot strap is fixed; but many windows are so convenient as not to require a foot post. A shelf or board fixed near it will hold all the tools. The machine may, if required, be fixed on a small but very strong bench made for the purpose. The lever or stay which lifts up and down, and moves from side to side, is of great use, it will fit either a large or small shoe; when it is down, the shoe is held firm between it and the side of the machine, and kept tight by the foot pressing on the strap. When this lever is thrown back, it leaves room for the heel to go down and rest on the bent stay at the bottom, so that the work at the toe may be done with pleasure; and when any thing is wanting to be worked at the heel, the toe rests on the stay below, and is

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in most cases held by the strap. Within two or three months last summer, I sold more than twenty of these machines.

I am,
Sir,
Your humble servant,
J. KING.

No. 4, Mulberry Court, near the Bank,
London, March 25, 1812.

CERTIFICATES.

WE, the undersigned, have worked with the machine invented by Joseph King, for making boots and shoes standing, and find it much better for the health than sitting, as it prevents many disorders occasioned by the pressure upon the breast or stomach, when making shoes or boots in the common way. From the manner in which this machine is formed, and its cheapness, we believe it to be the most likely of any yet made to become generally useful.

WILLIAM HOLMES, No. 74, King Street, Golden Square.
WILLIAM CAMPS, near Portland Place.
E. DIMOND, No. 10, Mill Hill Mews.
WILLIAM SAMWAYS, Mill Hill Mews.
GEORGE RABNETT, Mill Hill Mews.
HENRY RABNETT, Mill Hill Mews.
WILLIAM ANLEY, No. 7, Gees Court, Oxford Road.
JACOB DAVID, No. 12, Gees Court, Oxford Road.
SAMUEL BEAMONT GOODCHILD, No. 24, James Street.
GEORGE LAKER, No. 17, Silver Street, Golden Square.
HENRY WILLIAMS, Lamp Office Court, Lambs Conduit Street.
WILLIAM WHEELER, No. 89, Shoe Lane.

Reference

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Reference to the Engraving of Mr. J. KING'S *Machine, to enable Shoe and Boot-Makers to work standing, and without pressure upon the Breast or Stomach. Plate* 8, *Fig.* 1, 2, 3.

FIG. 1, represents a plan of this machine; fig. 2, a perspective view of it in use; and fig. 3, a section through the middle; the machine consists of an oblong frame of wood formed of two sides A B, with cross pieces C D E F it is very conveniently fixed in a situation, and at a proper height for working, by screwing it down to a window cill, (a position of which as shown in fig. 2, at G,) by means of two screws *a a*, such as are used for bedsteads; these, and an iron bracket I, fig. 2, extending from the front, E, of the machine, being screwed against the wainscoat H, support the machine very steadily; or a stand consisting of proper legs may be used if preferred, the parts A B D E F, of the machine, are covered with leather, so as to become like cushions to support the last, as shown at L, fig. 2, and it is held down by a strap M, (in the manner shown by the figure,) which has a loop or treadle at bottom for the foot; the principal novelty of this invention, consists in a lever H, which is attached by an iron link *b*, to a wire *d*, upon which it moves as a centre; and when that is down in its place, as in fig. 1, a small point or beak of iron *d*, fig. 3, enters into holes made in an iron plate *e*, and the other end of the lever comes to rest on a stop *f*, which, as shown in fig. 1, has several holes in it; and the end of H has also a little iron beak which enters these holes, thus when the piece H is shut down, it becomes an immoveable cross bar of the frame, and the last may be held or wedged in, between this and either slide A or B of the frame, in the manner shown by the dotted lines in fig. 1, and may be held down by the strap M; but to adjust the width of the opening H A or H B, on which the last lies, nothing

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more is necessary than to lift up the lever H, so that the point *d*, fig. 3, clears the holes of the plate *e*, then sliding the link *b*, along the wire *d*, to the intended width, and shutting it down again, the beak or the point *d*, fig. 3, enters some other hole in the plate *e*, and holds the lever H, fast in the new position, so as to adapt it to the width of any last, or to hold it in any position at pleasure.

At other times the last is held down in the manner of fig. 2, by the foot-strap M, pressing the lever H upon it; in fact the machine forms an universal vice, which will support and hold the last firmly down upon the cross-bar F, in any required position; *g* and *h*, fig. 1, are very stiff pieces of sole leather fixed in the frame, which, in certain positions, also support the last.

TWENTY GUINEAS *were this Session voted to Mr.* DAVID RITCHIE, *No. 3, Princes Street, Perceval Street, Clerkenwell, for a Compensation Pendulum, to prevent the Rate of a Clock from varying by Heat or Cold. The following Communications were received from him, an Explanatory Engraving is annexed, and a Model of the Pendulum preserved in the Society's Repository.*

SIR,

I BEG leave to lay before the Society of Arts, &c. for their inspection, the model of an expansion pendulum upon a new construction, the invention of,

Sir,

Your most obedient humble servant,

DAVID RITCHIE.

No. 3, Princes Street, March 24, 1812.

TO C. TAYLOR, M. D. SEC.

SIR,

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SIR,

I SHALL beg leave to point out distinctly such parts of the model sent, as I do not claim as my improvements, and likewise those that I do claim.

Expansion bars have been used by many persons in various ways. The spring balls which correct the expansion bars, have likewise been used. My improvements in this pendulum I consider to be, in the application of the two expansion bars, and the springs that remove the weight of the pendulum ball from the expansion bars; by which the bars may be reduced to the size of the pendulum rod, and exposed equally to the heat and cold; likewise, in having the compensation near the ball, and only one pendulum rod.

DAVID RITCHIE.

SIR,

IN addition to the opinions delivered by many of the trade, at the Committee, in favor of Mr. Ritchie's pendulum, I shall beg leave, for the general information of the Society, to point out more fully its properties.

I shall, however, first mention the principal objections to the compound pendulums now in use.

The Gridiron pendulum has much friction, is difficult to adjust, and from the great weight of the rods, the center of oscilation is much above the center of gravity.

Ellicot's pendulum, in its improved state, is objectionable on account of its friction; Mr. Ward's pendulum has

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has likewise friction; Mr. Read, of Woolwich's pendulum has friction, and depends upon a doubtful metal, viz. zinc.

Mr. Doughty's pendulum has the whole weight of the ball and two pendulum rods, resting on the extreme ends of a long compound bar, placed at the upper end of the pendulum, which cannot be adjusted without altering the length of the pendulum, and from the weight of the rods and bar, the center of oscillation is considerably above the center of gravity. The late Mr. Grimaldé applied a single compound bar to the lower end of a pendulum, but it is now laid aside.

Mr. Ritchie's pendulum has only one steel rod, with two short compound bars of brass and steel, placed near the ball, at right angles to the pendulum rod; the bars, being parallel, admit of perfect adjustments without altering the rate of the clock. A simple contrivance is introduced between the compound bore which takes off the weight of the ball, and leaves them at liberty to contract or expand, free of every incumbrance.

The compound bars may be reduced to the size of the pendulum rod, and will be equally affected by heat and cold. It is free from friction. It has some advantages over the mercurial pendulum, by being portable, and not liable to be deranged. It may be applied to the smallest table clock, or the largest turret. It is likely to be of great public utility, and can be afforded for less than the expense of the most approved pendulums.

I am, Sir,

Your obedient servant,

THOMAS RAM[illegible]

Islington, April 14, 1812.

To C. Taylor, M. D. Sec.

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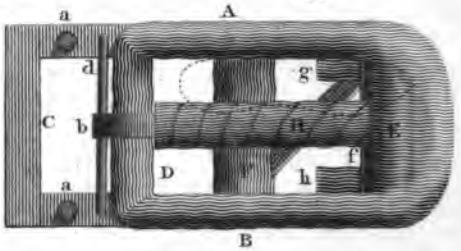
Mr. David Ritchie's Pendulum.

Fig: 1.



Mr. J. King's Machine for Shoe-makers.

Fig: 5.

Fig: 2.

Fig: 4.

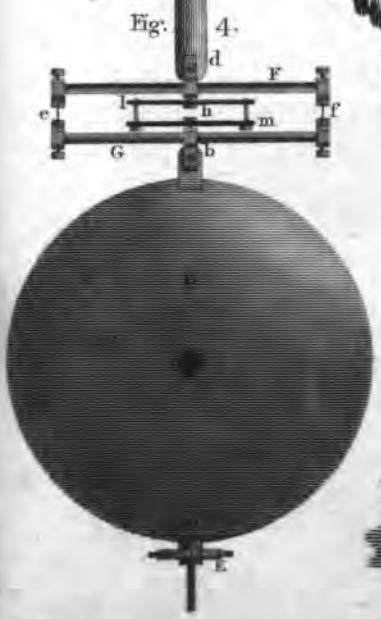
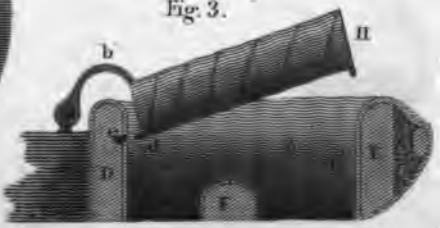


Fig. 3.



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Reference to the Engraving of Mr. DAVID RITCHIE'S *Compensation Pendulum. Plate* 8, *figs.* 4 *and* 5.

THE compensation of this pendulum operates upon the same principle as the compensation balance used in the modern chronometers, namely, the flexure of a bar compounded of two metals, brass and steel, for instance, of different powers of expansion, under any certain degrees of heat. Fig. 4, represents a front view of the pendulum, and fig. 5, an edge view of a part, in which A, fig. 4, is the suspending spring, and B, the ball, C, the steel rod of the pendulum, and E, the screw-nut, by which it is adjusted to time; the compensation part consists of two compound bars, F and G, the former of which is connected by means of a brass socket *a*, which is screwed to the lower end of the rod C; the bar G, is connected by a similar socket *b*, with a short steel rod which passes through the pendulum ball B, and has the nut E tapped upon it; the two bars, F and G, are connected together at both ends, by two pairs of sockets *ef*, one of which is shown detached at R; it consists of two pieces of brass, *i k*, each having a mortise through it, to receive the end of one of the compound bars, and a small screw to fasten them in; the two pairs of brass sockets are connected by a small piece of watch-spring, having a hole drilled in the middle of it. The principal sockets, *d* and *b*, have each a small screw *h* tapped into them, which fixes them upon their respective bars F G: the heads of these screws pass through two small springs, *l m*, one of which is shown separately at T, and the ends of these springs are united by two small screws, *l m*. The intent of these springs is to take off the weight of the ball, and allow the compensation

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compensation springs freedom to act. The action of this compensation pendulum is this,—on being heated, the rod C expands, and would let the ball B down farther from the point of suspension, but for the compensation which counteracts this tendency; the bars, F G, are made, as before-mentioned, of brass and steel rivetted together, the upper side of F, and the lower side of G, are steel, as shown by the dark lines, and the adjacent sides of both bars are brass. Now, it is the property of a bar thus compounded of brass and steel, to warp or become convex on the brass side, when heated, in consequence of the greater degree of expansibility of that metal; therefore, in this pendulum before us, when the rod C elongates by heat, the two bars, F G, at the same time both become convex within side, and as the ends are confined a certain distance asunder, by the connecting pieces, *e f*, the two sockets, *d b*, approach each other a certain quantity, tending to elevate the ball: and this quantity is adjusted to be equal to the descent which would have been occasioned by the lengthening of the rod C. The adjustment for the quantity of the compensation is made by experiment, altering the quantity of the compensation, by sliding the two connecting pieces, *e f*, nearer to the central rod, which diminishes the quantity of compensation, and by removing them nearer to, or farther from the centre, it may be regulated at pleasure.

The

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The SILVER MEDAL *of the Society was this Session voted to Dr.* GEORGE CUMMING, *M.D. of Denbigh, in Wales, for his Invention of a Vapour, Fumigation, or Shower-Bath, adapted, at a cheap expense, for the Use of Public Hospitals, or Private Families. The following Communication was received from him, an Explanatory Engraving is annexed, and complete Models of the Apparatus are preserved in the Society's Repository.*

SIR,

HAVING been requested, by the governors of the Denbigh Dispensary, to publish an account of a vapour bath of my contrivance, and which I lately had the honor to present to them, for the use of that charity, it being, in their opinion, well calculated, from its simplicity, cheapness, and efficacy, to bring into general use an agreeable and salutary practice, as well as a powerful remedy in many diseases well known in this country in former times, but till lately neglected, and in a manner forgotten. I beg leave, therefore, to offer it to the attention of the profession, and public in general, through the medium of the Society of Arts, &c. Allow me to assure you, that I do so more with a view of rendering it useful than for the sake of reward.

I am, Sir,

Your obedient servant,

GEORGE CUMMING.

Denbigh, April 20. 1812.

TO C. TAYLOR, M.D. SEC.

SIR,

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SIR,

HAVING been led to form a very favorable opinion of vapour bathing, and daily meeting with cases that promised to derive benefit from its use, I was induced to send for Dr. Kentish's Treatise, second edition, on that subject, immediately on seeing it advertised; and I need hardlyobserve, that having never seen such a contrivance, I was much disappointed to find, that he had omitted to describe the nature of the apparatus he employed. Possessing, however, the command of an excellent steam-boiler, with other conveniences, at the Dispensary of this place, I determined to avail myself of them, and, if possible, to erect a bath for myself. To those who have made the economical application of steam an object of attention for culinary purposes, the steps that led to the present contrivance will readily appear, but as there is some resemblance betwixt the bath in question, and that of the Honorable Basil Cochrane's, I beg to state, that mine was contrived in the summer of 1810, and completed in November following, which was some months before I had an opportunity to consult his treatise, or indeed to derive, directly or indirectly, any knowledge whatever of the nature of his apparatus. Finding, however, my bath to answer beyond expectation, I naturally became anxious to know how far it was inferior or superior to those already in use, and Dr. Kentish having condescended to refer his readers to the Honorable Mr. Cochrane's book, as containing plans for vapour-baths, I was induced to send for it to certify myself on that head. Having stated this, I have only to add, that every needless expense and ornament in the following bath I have carefully avoided. My object throughout has been to produce a simple,

cheap,

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cheap, durable, and efficient apparatus. It would not, however, be difficult to point out, that local improvements, for the use of private families, may occasionally be made. For instance, the upper part of the bath might be made to move between upright pillars, something like the bell of a gazometer, and air-tight moveable joints, such as are used for chemical purposes for procuring oxygen, &c. might be substituted for the tin tubes at present used.

I have to observe, that the bath, as it now stands, can be heated to 120 degrees, of Fahrenheit's Thermometer, with the present boiler, &c. in the course of twenty-five minutes, viz. allowing twenty minutes to raise the coldest water to the boiling point, and five minutes to heat the bath from 40 to 120 degrees, when about 12 ounces of water will be found to be collected at the bottom of the bath; but it is worthy of remark, that a simple oblong tin-boiler, of two and a half gallons, (made originally for the topical application of steam, as recommended by Dr. Bardsley, of Manchester) has been found to answer every purpose for my bath, a circumstance that cannot fail to recommend my bath to the attention of private families, for when mounted, as in the model I have sent, it can be moved in one piece, and used in any bed-room or other room where there is a common fire-place.

The expense of heating the bath is so trifling, that several persons may bathe at the cost of one penny.

I need scarcely point out to you, that the bath, in addition to its other advantages, will form an excellent fumigating machine for medical purposes, and that the most powerful chemical vapours may be safely thrown into it.

Description

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Description of Dr. CUMMING'S *Bathing Apparatus.*

THE bath is extremely simple, and may be conveniently made of any piece of cooperage, of sufficient dimensions, but nothing can perhaps answer better than a common wine pipe, which, after being well washed, is to be sawn across, about its middle, then to be well scraped and cleaned on the inside, and afterwards placed vertically upon a frame with castors. The upper half (in the top of which an aperture has been previously prepared for the head and neck of the bather) is to be furnished with cords, pullies, and counterpoise, so that by connecting it with any beam, roof, or ceiling, it can be raised or depressed, or in other words, the bath can be opened and shut with the greatest facility.

Upon the margin of the lower piece of the bath there is a groove, three fourths of an inch deep, receiving the circumference of the upper half, and which is thus formed. A strong iron hoop is first put on the outside, and then well driven about half its depth, when a similar one, after being rivetted, is driven to the same depth within.

The groove thus formed is of the first importance, as it not only renders the bath, with the assistance of a little water, steam-tight, but also effectually prevents it from undergoing any change of shape. It may also be observed, that the above hoops are so hammered or set, as to make the groove somewhat wider than the staves upon which they are applied, and that the edge of the upper or moveable piece of the bath is cut with a cooper's knife, so as readily to fall or slip into it.

The boiler is distant from the bath about six feet, and the steam-pipe is made to enter an inch above the bottom, and

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and to extend itself horizontally to the centre of the same, when with the view of equally diffusing the heat, a piece of coarse linen, or calico, stretched upon a hoop, (with a notch to admit the steam tube) is placed over it. This may be called the diffuser, and is made of a less diameter than the bottom of the bath, in order that the feet of a strong frame or grating, to support the bather, may securely rest upon the bottom of the bath. Immediately over this grating, a floor of split-ash (like a sieve) is laid, and upon this a seat is placed, which is fastened to the side of the bath, by means of a bracket.

This seat serves the bather as a step, as he goes in or comes out of the bath.

To accommodate the various sizes of bathers, light frames, covered with split ash, after the manner of cane-work, may be placed upon the said seat, as required.

The whole of these loose articles may be packed within the bath, when not in use, and placed in proper order, in a few seconds, when wanted.

Such is the general description of a bath that may be made in any village, and which, in point of expense, falls within the purchase of almost every family.

It is simple, cheap, neat, durable, and efficient, and moreover admits of a great variety of applications.

GEORGE CUMMING.

To C. Taylor, M. D. Sec.

Reference to the Engraving of Dr. Cumming's *Bathing Apparatus. Plate* 9, *fig.* 1 *to* 10.

Fig. 1, A A, Shows a general view of the bath, made of a wine pipe, which divides in two parts at the circle or groove B, at the part shown by dotted lines within the hoop.

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C, The block, cords, and pullies, for raising and suspending the upper part of the bath, or for opening and closing it.

D, The weight to counterpoise the upper or moveable part of the bath.

E, A strong wire rod fastened into the counterpoise weight, to open or shut the bath.

G, The step-ladder to enable the bather to go in or come out of the bath.

H, The steam-boiler.

I I, Tin tubes for conveying the steam into the bath when wanted, or to carry off the steam into the chimney, or open air, when not employed, or when produced in too great quantities.

K K, Stop-cocks for regulating the direction of the steam, and the temperature of the bath.

The dotted line L, shows the position of the steam-diffuser, which is also shown separate in fig. 2.

The dotted line M, the position of the strong frame, or grating, fig. 3, for supporting the weight of the bather.

The dotted line N, the position of the flooring or sieve, fig. 4, which is to be laid upon the strong grating.

O, The seat or step, fig. 5, the foot of which rests on the flooring, or sieve, and the seat part on a bracket within the bath.

P, An occasional seat, fig. 6, to be used upon fig. 5, when the bather is so low that his head would not otherwise rise above the aperture prepared in the top part of the bath. In its general use, as a steam-bath, the head should be raised above the surface, and the steam retained within by napkins lapped round the bather's neck.

Q, A thermometer, placed to ascertain the heat of the bath.

R, A cock for drawing off the water of condensation.

S, The

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S, The frame with castors to move the apparatus from one place to another.

To use the Apparatus for total immersion in Steam.

Fig. 7, shows a contrivance for total immersion in vapour or steam. It is a light vessel, eighteen inches deep, well hooped, and made to fit at its wider end on the top of the bath.

a, An aperture for a tube for the bather to breathe through.

b, A glass sky-light, to obviate any objection against bathing in the dark.

c, An aperture for a thermometer in vapour bathing, or to admit a funnel when the apparatus is wanted to form a shower-bath.

To use the Apparatus as a Shower Bath.

A tin vessel for holding the water is placed upon pivots, turning in grooves, in the situation shown by the dotted lines *d*, fig. 7; a tin cullender of the form, fig. 8, is then suspended by a small cross-bar across the aperture of the upper part of the wine pipe, and a circular curtain of linen or calico, from three to four feet deep, of the form, fig. 9, is fastened upon the outside of the lower rim of the upper or moveable part of the bath, which forms a complete shower-bath on the water being discharged from the tin vessel, through the numerous small holes of the cullender, on the person within the bath.

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Fig. 8, shows separately the cullender or perforated tin vessel of the shower-bath, with its loop and rod to suspend it from the aperture above-mentioned.

Fig. 9, is a separate view of the curtain before-mentioned, mounted upon its hoop, ready for fixing upon the lower rim of the upper part of the cask, above the division B, and being thus placed when the moveable part of the bath is elevated, it not only conceals the bather from the observation of attendants, but also prevents the water, as it descends, from being scattered out of the bath.

This curtain should also be used in steam-bathing, as it enables the bathers to dress and undress in the bath, with much delicacy and comfort.

To use the Apparatus as a Sudatory, or Warm-Air Bath.

Fig. 10, is a tin box, in the form of a ring, for heating the bath as a stove; it contains about eight square feet of surface, and ought to be painted black, in order to increase its radiating powers; T shows the aperture for the steam tube; V is an aperture to allow the escape of a portion of the steam into the air, and thereby to obviate the inconvenience of the lid of the boiler being forced off.

This part of the apparatus is of considerable importance, as it enables the bath not only to be used in certain cases as a stove bath, but the whole bath may be speedily dried by its means, and thereby meet the more delicate feelings of some bathers who may be obliged to use the bath after others.

Fig.

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Dr. Cumming's Vapour Bath.

Fig. 11.

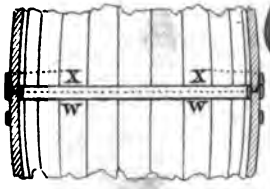


Fig. 1.

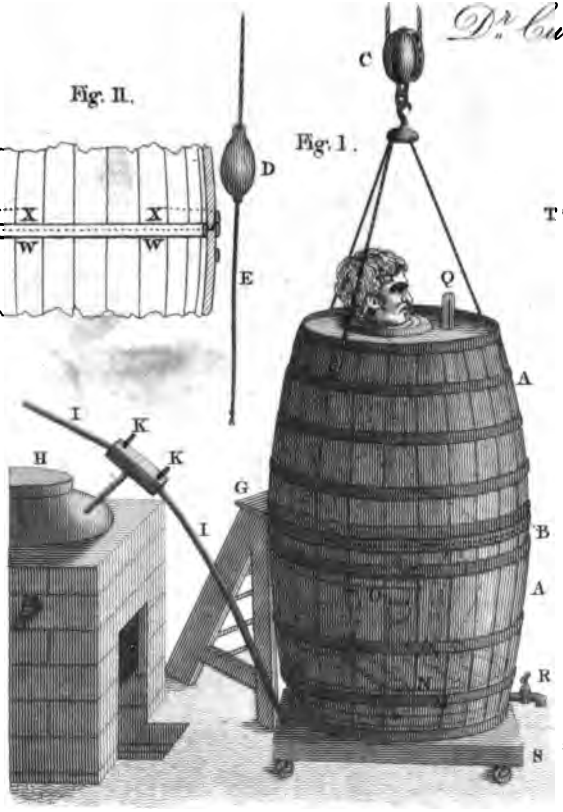


Fig. 10.

Fig. 2.

Fig. 3.

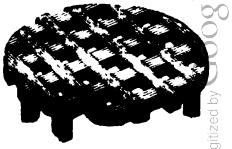


Fig. 4.

Fig. 6.

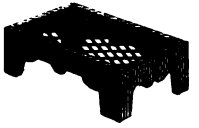
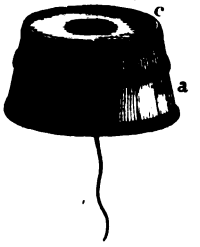


Fig. 5.

Fig. 9.

Fig. 8.

Fig. 7.



Drawn by J. Farey.

Engraved by J. Farey.

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Fig. 11, is a section of the wine pipe or bath, where the junction of the upper and lower parts take place; W W, show the groove made by the two iron hoops, between which the small portion of the wood of the upper part of the wine pipe left below the circle or iron hoop, X X, enters and forms a close joint.

Extract from the Report of the General Dispensary at Denbigh, for the year 1811.

Resolved, That the Thanks of this Meeting be given to Dr. Cumming, for his present of an *Improved Vapour Bath*, and that he be requested to publish an account thereof, it being well calculated, from its simplicity, cheapness, and efficacy, to bring into general use an agreeable and salutary practice, as well as a powerful remedy in many diseases well known in this country in former times, but till lately neglected, and in a manner forgotten,

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PAPERS

IN

COLONIES AND TRADE.

The THANKS *of the Society were this Session voted to* JAMES AMOS, *Esq. of St. Helen's-place, London, for the following Communication respecting the article Caoutchouc, or India-Rubber, and of its production in the East Indies. A sample of the article is preserved in the Society's Repository.*

DEAR SIR,

I HAVE the pleasure to hand you an extract of a letter I have received from our mutual friend, Dr. Roxburgh, of Calcutta, dated February 22, 1811; viz.

" I send you herewith a sample of the Indian-rubber
" of this country; be so good as to ascertain its value in

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" this, or in any other state, in the London market, and
" how much of it could be sold annually. I have dis-
" covered the tree which produces it, and believe it may
" be had in any quantity."

I forward to you the specimen of Bengal rubber to which the Doctor refers; perhaps some of the Members of the Society know more about it than I have yet been able to learn.

Some important communications, on the chemical qualities of this curious substance, and its application to the Arts and Manufactures, are inserted in the *Annales de Chymie*; and I am informed that it is already employed for many useful purposes in London, and likely to become an article of considerable attention and demand.

It would certainly be a national object to encourage largely the products of our colonies, and whatever may be the value of this article, I think it will deserve further notice and enquiry.

The common rubber is usually procured from the Brazils; the freight from thence is much lower than from the East Indies, but the duties may perhaps be taken off in favor of our own colonies, or some means adopted to promote, through this latter channel of our commerce, an article which is likely to come into very extensive use, provided that it can be sold in London on reasonable terms.

I am, Dear Sir,

Very truly yours,

JAMES AMOS.

9, St. Helen's-place, Dec. 12, 1811.

To C. Taylor, M. D. &c.

In

In the 23d Volume of the Society's Transactions, an Account is given, by Mr. W. SALISBURY, *of Sloane-street, of a Method of packing Plants and Trees, intended for exportation, in the Sphagnum Palustre, or Peat-Bog Moss, so as to preserve their vegetative powers for many months. In the same Volume, other Methods are given by Dr.* ROXBURGH, *of Calcutta, for taking care of growing Plants whilst at Sea. The object of preserving Plants is important; and as the Society have received some interesting Communications upon the subject, they have thought proper to print them in the present Volume, in order to show, that when plants are sent to the East Indies in the Sphagnum Palustre, the Packages should not be placed in close confinement in the hold, for so long a voyage.*

DEAR SIR,

PRAY tell Dr. Taylor, Secretary to the Society of Arts, &c. with my compliments, that Mr. Salisbury's Sphagnum Palustre has cost the Honourable East India Company a great deal of money, without any thing to show for it. My reason for desiring you to do so is, to prevent any more plants from being sent so long a voyage packed in that manner. Three times, I think it is, that Mr. Salis-

bury

bury has sent large collections to this garden, and constantly without a single one alive.

I am, Dear Sir,
Your obedient servant,
W. ROXBURGH.

Calcutta, Feb. 22, 1811.

To J. Amos, Esq. St. Helen's-place,
London.

DEAR SIR,

On the 2nd of September I gave you a most melancholy account of your seeds and roots, sent by the General Stuart, and of the chest of plants packed in the Sphagnum Palustre, or peat-bog moss, by Captain Swinton, nothing could be worse, not one single seed grew, nor was there a plant alive, more owing, as I presume, to the careless manner in which they were shipped, than any thing else; they came in the hot damp shut-up hold, which will destroy all vegetable life in one-third of the time of a passage from England to India; the contents had become damp, and were all putrid, and sticking together. The voyage is greatly too long, and too many climates to pass through for your moss to answer. As the expense to the Company is too great for more of these experiments, I must beg you will not send any more upon the authority of any orders you may have received from me.

I am, Dear Sir,
Your's very obediently,
W. ROXBURGH.

Calcutta, Feb. 28, 1811.

To Mr. W. Salisbury.

SIR,

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SIR,

HAVING had the pleasure this spring of receiving several documents respecting the success of packing plants according to my mode, as stated in the Society's transactions, Vol. XXVII. I take the liberty of enclosing them to you, as they not only prove the advantage of the mode prescribed, but that we are likely to have a great increase of foreign plants in consequence thereof. One person having, as you will find, imported lately *eleven thousand*, which are now growing in as fine a state as if they had only been removed from one part to another of the same garden.

But although flattering as these accounts may appear, I am nevertheless concerned to state, that the same success has not attended some packages sent to Calcutta; as my friend Dr. Roxburgh has stated; but I have reason to impute the loss in a great measure to their being, as the Doctor states, *placed and left during the whole passage, in the hot damp shut-up hold of the ship, which will destroy all vegetable life in one third of the time of a passage from England to India.* This situation was contrary to my orders given respecting them, as in such voyages the boxes should be placed in some airy part of the ship, and, in great heats, the outsides frequently sprinkled with fresh water, which would not only tend to keep the contents cool, but also the moss moist, which is no doubt one very essential point.

In those cases, where fresh water is an object too valuable for such a purpose, if an awning or cover wet in sea water, could be so placed over the packages, as to admit an evaporation of the moisture, without any salt water touching the packages or contents, the moisture so evaporated

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rated would be pure fresh water, and furnish coolness and nourishment to the plants.

In addition to other testimonies, I have enclosed a letter from my noble friend Baron Nicolay, at Wyburg, in Finland, to whom I sent a box of plants for experiment, under the care of Colonel Waxall. I have also sent many plants to Malta, among which were some of the East India aquatics, and which succeeded remarkably well, packed in this moss.

I am,

Dear Sir,

Your's very truly,

W. SALISBURY.

Botanic Garden, Sloane Street,
Jan. 15, 1812.

To C. TAYLOR, M. D. &c.

DEAR SIR,

THERE is no novel so full of strange and tragic events, as the history of the small box you entrusted to the care of Mr. Waxall, in April last, when he hoped to set out immediately for Petersburgh. The ships destined for Admiral Sinawin, were on a sudden employed otherways, and our poor people could not reach Riga before the end of August; from thence Mr. Waxall made haste to arrive by land at the capital, leaving behind him all his equipage, which did not arrive till the latter end of September; Mr. Waxall having then delivered the box to the new gardener of the academy, (Mr. Preising having died last winter,) this gentleman kept it under his hands a whole fortnight. My son having finally received it, gave it to a carter coming hither, who having no room for it, delivered it to

to a peasant then leaving Petersburgh, without advising me of his name, so that a week more elapsed before it came to my hands only three days ago. The plants, though carefully packed up, could not fail, after a period of almost seven months, and having also suffered a very sharp cold, to be mostly destroyed. We have saved only six or seven of them, viz. two Bignonias, two Roses, (diversis foliis,) one Erica Corienthoides, and one Viticella fl. pl., and also one plant which had lost its number, and cannot be known in its present state; some of them being more recent cuttings, without sufficient roots, could not but perish. I hope we shall restore the survivors to perfect health by the care we take of them; the preservation of some at least of the plants, after so long a journey, in such a season, is a strong proof of the usefulness of your discovery. The encouragement given to you by the Society of Arts, &c. is certainly well deserved, you having rendered an important service to Botanists. I leave entirely to you the choice of such plants as you think proper to send in future for my collection.

I am,

My dear Sir,

Your most obedient,

NICOLAY.

Yonrepos, near Fyburg, $\frac{2}{14}$ November, 1809.

To Mr. WILLIAM SALISBURY.

Botanic Garden, Brompton.

DEAR SIR,

THE plants you sent me by the Minerva, in 1808, I planted on January 6, 1809; they were well packed.

I wish

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I wish however to observe, that when plants are to go a long voyage, it will be proper for the labels to be tied to them with a strong brass wire. I have transplanted them this season to the top of a mountain, about 2300 feet above the level of the sea. I have not been able lately to go there, but, according to report, the vines and mulberries are growing exceedingly well, the latter rather luxuriantly.

Of those sent here last, not one of them is lost, I saw them on the 23rd instant; these are planted in low level land. The Tea-trees were as green when I opened the case, as they could have been when dug up. I planted them instantly; and I leave it to you to make your remarks, whether the soil and climate will answer; they have budded about one inch and a half since planted. The mulberries grow from cuttings; I have some in my garden. The white mulberry trees seem to grow better than the red.

I hope in future to write to you further on the subject.

I remain,

Dear Sir,

Your humble and obedient servant,

A. VANNECK.

Sierra Leone, Sept. 25, 1809.

To Mr. WILLIAM SALISBURY.

SIR,

YOUR's, of May 2, I received about three weeks ago, along with the two boxes of fruit trees, shrubs, &c. packed in

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in the Sphagnum Palustre moss. All the fruit trees were in a high state of preservation; I have planted them according to your direction in Vol. XXVII. of the Transactions of the Society of Arts, &c. and have every reason to suppose they will do well. Most of the flowering shrubs, carnation and pink roots, are dead, the figs and grape vines look well. I have given to Dr. Anderson, of our Botanical Garden, a few of the plants, along with the box of moss, &c. and he is to send you some plants put up in the same moss, which I think will answer, as the moss appears to be in a high state of vegetation. I shall inform you at a future period how the trees come on.

I am,

Sir,

Your most obedient servant,

J. SUTHERLAND.

St. Vincent, August 4, 1810.

To Mr. William Salisbury.

SIR,

By the Nelson, Captain Herbert, Mr. Sutherland received from you two boxes of plants, packed up in the Sphagnum Palustre, and as I was present when the box, No. 2, was unpacked, he has requested me to communicate to you its appearance, and the success of the experiment. The ship arrived in the end of June, and the boxes

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boxes were not removed till nearly a fortnight afterwards; by a small vessel to Rebecca, a distance of about thirty miles, where they were landed and carried in a cart the distance of about one mile, to the place where they are now planted.

Dr. Anderson informed me, that one of the boxes appeared to have been opened after you packed it, and before embarkation, which he supposes to have been done at the Custom-house in London; the other box, No. 2, did not appear to have been meddled with. Upon opening this box, the moss appeared to be in a perfect state of vegetation, and of a yellowish green colour; the plants had many of them shot out from the stems, particularly the apple plants, and some from the roots. The only part of the assortment that was totally decayed were the carnations, some of the other plants appeared somewhat injured, but upon the whole they might be esteemed as in high preservation; this is the more to be considered, as they must have been taken up in a very unfavourable season for the experiment. A very unexpected puzzle presented itself in taking out the plants, the labels had been fixed on by a small iron wire, which was corroded by the wet moss, and has generally dropt off, so that in many cases we can only guess at the plants. On another occasion, the labels ought to be fixed by a copper or brass wire, of at least the thickness of the largest string of an harpsichord, and one to each individual plant. The boxes and moss are sent to Dr. Anderson, who intends returning them to you, with some tropical plants, but if this part of the experiment fails, you are not to be angry at your discovery, as it is performed under very unfavourable circumstances, for the moss got dipt into the salt water, in sending

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sending from the sloop at Rebecca; therefore perfect success cannot be expected. I recommend you to take care that your boxes do not exceed fifty pounds weight, which forms a light load for a negro; and the package in such mode will not be again exposed to the accident of salt water.

Fully persuaded of the usefulness of your discovery,

I am,

Sir,

Your most obedient servant,

GEORGE YOUNG.

Cocomacrubon, St. Vincent,
Augt. 10, 1810.

To Mr. William Salisbury.

The above account was confirmed by a letter from Mr. Questal, of St. Vincent, who was induced from the circumstance to give Mr. Salisbury an order for some plants, to be sent to him through the hands of Messrs. Boddington and Sharp, of London, with orders for them to pay the value on delivery.

SIR,

Understanding that a question has arisen respecting the advantage of your mode of packing plants for exportation to foreign climates, I have taken the liberty to

 acquaint

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acquaint you, that a few weeks previous to my departure from the colony of Sierra Leone, in Africa, which was in February, 1811, I was shown by my friend Mr. Vanneck, a box of plants which he had received from you, packed in green and yellow moss, every one of which, (with exception of the camphor plant,) was alive and in a state of foliage; this I understood to have been also the case with a number of Mulberry plants you had sent thither at a former period. Mr. Vanneck expressed his conviction from the proofs these instances afforded, that the packing of plants in the Sphagnum Palustre moss, was the best calculated of any method he had heard of, to answer the purposes of protecting them from injury, and keeping them in a sufficient state of vegetation during the passage. I think it proper to acquaint you with the above circumstances, and have the honour to be,

Sir,

Your obedient humble servant,

G. RICHARDS.

London, January 14, 1812.

To Mr. WILLIAM SALISBURY.

SIR,

IN answer to your inquiries respecting my mode of packing the collection of plants, which I have brought over this season from America, I inform you that they were upwards of *eleven thousand in number*, which were all brought in eighteen boxes; fourteen of which were four feet

feet long, two feet wide, and fifteen inches deep; and four were five feet long, and in other respects the same dimensions as the others, packed in what is called in America, swamp moss, the Sphagnum Palustre, and closely nailed down. They were brought in the hold of the ship, as any other description of goods. The plants are now in a fine growing state, as may be seen by yourself, or other persons who wish to judge for themselves. It is the opinion of the most competent judges, that no collection of plants has ever been brought from America in such good order.

I know of no mode of packing plants so safe, and by which they can be conveyed to so great a distance, at so little expense and trouble as the one described; nor any other substance in which plants may be kept so long out of the ground, as by the Sphagnum Palustre.

I am,

Dear Sir,

Yours, &c.

JOHN LYON.

Chelsea, June 4, 1812.

To Mr. William Salisbury.

The Teak Tree of the East Indies, is employed there for Ship Building, and for the same purposes that Oak is used in England. The Ships built of Teak Timber, are found to be remarkably

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durable; and considerable quantities of this Wood are now imported from India into Great Britain. It is probable that this Tree may be cultivated to advantage, both in our African and West Indian Colonies; and the Society impressed with an idea of the importance of the subject, are of opinion, that they will render an essential service to the interests of the United Kingdom, and its Colonies, by inserting the following Communication, with which they have been favored by their Correspondent and Honorary Member, Dr. WILLIAM ROXBURGH, *of Calcutta, drawn up by him some years ago, and of which the value is further established by subsequent experience.*

SIR,

THE timber of the Teak-Tree is in India what Oak is in England; it is, however, unnecessary to enlarge on their comparative value, because oak will not grow in India; our attention ought, therefore, to be confined to Teak alone, not only as being by far the best wood we yet know of in this country for ship-building, but also for the house-carpenter, and almost every other work where strong, durable, easily-wrought light wood is required. The advantages to be derived from the cultivation of so valuable a tree, where nature has not bestowed it, must therefore be obvious to every one; particularly in Bengal, where it grows well, and the demand is so great. The Teak tree is a native of Pegu.

Government,

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Government, sensible of what is here stated, have long given every possible encouragement for an extensive propagation. But to render it still more general, the native land-holders must be made sensible of the advantages they may expect to derive from large plantations thereof.

The growth of the tree is rapid, and at all ages the wood (from various experiments,) appears excellent. Some trees in the Honourable Company's Botanic Garden, brought from the Rajahmundry Circar in 1787, were in 1804 from three to upwards of four feet in girth, at three and a half feet above ground, and high in proportion *. These plants were about twelve months old when sent from the coast, so that their present age is about 17 years. A tree promising so much advantage in so short a space, compared to what the oak requires in England to become serviceable in the marine yard, makes it highly worthy of every attention and encouragement. A few observations on rearing the plants from the seed, seem necessary, as I have often known seeds from the same tree succeed with one person, and totally fail with another.

The nut in which the seeds are lodged, is exceeding hard, contains four cells, and in each is lodged a single small seed. It has been ascertained, that they perfectly retain their vegetating power in the growth, even as far as eighteen months; however it is adviseable to sow them

* The largest of those trees, measured, at three feet and a half above the ground, in February 1796, forty-two inches in circumference. The same tree was in February 1804, fifty-two inches in circumference, at the same place; which gives an annual increase of one inch and a quarter. However, while the trees are younger, and in a more favourable soil than where this tree stands, their yearly growth is from two to three inches, which is fully double the increase of oak in England.

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about the beginning of the first periodical rains, or north-westers, after they are taken ripe from the tree in October. If sown about this period, or rather before than after, in well-shaded beds, about an inch asunder, and covered with about a quarter of an inch of earth, with a little rotten straw or grass spread over the earth, to keep the beds in an uniform state of humidity, by gentle waterings, should the weather prove dry; most of the nuts will be found to produce from one to four plants, in from four to eight weeks. However, it sometimes happens that many will remain in the ground, until the commencement of the second rains, nay even of the third; however, this is rare, yet it will be adviseable to sow the seed on a spot that can be spared, at least until the rains of the second season are well advanced; by not attending to this circumstance, many have thought the seed bad, consequently caused the ground to be dug up for other purposes.

The plants when they first make their appearance are very small, scarce so large as a cabbage plant when it first springs from the earth; their growth is, however, rapid. When they are about one or two inches high, they ought to be transplanted into other beds, at the distance of about six inches from each other, there to remain until the beginning of the next year's rains, when they are to be planted out to where they are to remain, or they may, when from two to four inches high, be planted out at once to where they are to grow; and it is not perfectly clear but by so doing they succeed better; as in taking up plants of any considerable size, say from one to two or more feet high, the roots are very apt to be injured, particularly the tap root, which retards their growth much, nay often kills them.

About

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About Calcutta they thrive luxuriantly in most places where they have been tried, and any tolerable degree of care taken of them; so that the only observations which seem necessary to be made on this head, are to avoid sowing the seed, or planting in such places as are low, or subject to be inundated; to keep them clear from weeds, and sparingly watered during dry weather, for the first year only. In a good soil, not much over-run with that coarse white-flowered grass, called by the natives Woola, (Saccharum); they will scarce require any care whatever after the first six months, from the time of being planted out where they are to stand. They will then be about eighteen months old; supposing them to have been transplanted twice, and in that time they will in general be from five to ten feet high, according as the soil is favourable, and out of all danger, except from north-westers.

With respect to the distance at which plants ought to stand in plantations, every one's judgment can direct. The oak requires a great space, as the crooked parts thereof are the most valuable, and required for the knees and other curved timber in ship-building; but Teak is naturally a straight-grained tree, and only used in Bengal, or at least in general, for the straight work, Sissoo being commonly employed for knees and other crooked timber; hence it may be concluded, that the straighter the Teak trees grow, the more eligible for every purpose for which this timber is generally employed in Bengal. They do not, therefore, require to be planted at a great distance, suppose from six to ten feet, in quincunx order; by being so close they grow straighter, and protect one another

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while young, which is particularly wanted where violent gusts of wind (such as our north-westers) prevail. When the trees grow up, they can be thinned out to advantage, as the timber of the young trees will answer for a variety of uses. The seed of this tree we have now in such abundance, as to render a few hundred plants, in the hundred biggahs, of little or no importance; and if the ground on which they are planted is not of the best sort, the more necessity there is for planting close.

Suppose the trees planted in quincunx order eight feet asunder, a Bengal biggah (which I believe is generally reckoned a square of one hundred and twenty feet) will hold about three hundred and ten trees.

It will be necessary, during the first ten years, to cut down about half of them, say one hundred and seventy, to give the rest more room; they are worth one rupee each.

Again, at from ten to twenty years, reckon half (eighty-five) of the remaining one-hundred and seventy, to be cut down, to make still more room for the rest; they will be worth four rupees each.

And again, at from twenty to twenty-five years, it may be necessary to thin them still more, say to another half, (or one-eighth of the original number) which will be worth eight rupees each. The remaining forty-two trees, when full grown, say in thirty years, may be expected to have, on an average, shafts or trunks thirty feet long, and, at least, four feet in circumference, which gives, according to the bases of timber-merchants' measurement, a girth or square of twelve inches. The dimensions of such a piece of timber, will therefore be thirty square feet, or three quarters

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quarters of a ton, which, at one rupee (or about two shillings and sixpence) sterling, per square foot, the average price of Pegu Teak in this place (Calcutta) for some time past, will amount to thirty rupees per tree. Nor is it likely that the price of this indispensable commodity will fall; our growing trade, and consequent increase of shipping, gives reason to think it will rather rise in price. Let us, however, be on the safe side, and say, that each of the last-mentioned forty-two trees will be worth only twenty rupees each.

From the above statement, the value of a biggah of land, planted with Teak trees, will produce, during thirty years, as follows:—

	Rupees.
In the first ten years 170 are cut, and reckoned to be worth one rupee each, is -	170
In the next ten years 85 more are cut, and worth four rupees each, is - -	340
In the next following five years 43 more are cut, and worth eight rupees each, is -	344
At the end of thirty years, the remaining 42 trees are reckoned worth 20 rupees each, is	840
Total produce at the end of thirty years	1694

Independent of the branches, many of the largest of which will be fit for knees, and other crooked timbers, of small dimensions, consequently of considerable value.

From the above sum of 1694 rupees is to be deducted the rent of the land for the before-stated time, together with the expense of planting, hedging, and taking care of

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of the young plants, during the first few years, after that they will require little or no care.

	Rupees.
The former, let us suppose to be three rupees the biggah, which is certainly an high rent, and will amount, in thirty years, to	90
Charges of planting and hedging, say	20
Wages of one man, per biggah, which is fully sufficient, for the first five years, at 36 rupees yearly - - - -	180
For the next twenty-five years, allow one man to three biggahs, is for one biggah twelve rupees, or for twenty-five years -	300
Total charges of one biggah, for thirty-five years	590
Deducted from rupees 1694, leaves a clear profit of - - - - -	1104

Potatoes, leguminous, and culinary plants, meliorating crops, may, with advantage to the plantation*, be reared in constant succession, on the same ground, during the first two or three years, or until the tops of the trees are too large to admit of their growth. The produce thereof will help to defray the expense of labouring the ground during that period; afterwards, as already

* About six years ago my gardener trenched a piece of useless ground behind some cottages, and planted it with refuse elm suckers; thus prepared, the poor people availed themselves of the circumstance, set the ground with beans and potatoes, and have continued to crop it ever since; this has been of service to them, and of infinite benefit to the trees, which, by means of this annual culture, have outstript their undisturbed brethren, and almost doubled their contents. *Bath Papers, Vol. 6, Page 17.*

observed,

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observed, little more will be required than keeping up a fence round the plantation, to keep cattle and idle people from hurting the trees, till they are so large as to be out of all danger.

A period of thirty years is only brought into the foregoing calculation, though it may well be imagined, that when in a healthy state they must continue to gain considerably, both in size and quality, for a much longer period. In the *Bath Papers on Agriculture and Planting, Vol.* 7, *Article* 1, *Letter the Fourth;* a single oak tree is traced to have taken seventy-five years in acquiring a single ton; whereas in another seventy-five years, the same tree gave seven times as much in quantity, besides the increase in value as naval timber.

In addition to the remarks already made, it may be proper to add the following extract of a letter from Thomas Barnett, Esq., to G. H. Barlow, Esq. Chief Secretary to the Government, dated 8th November, 1799.

" A few years ago, a number of teak tree plants were, " by orders of Government I believe, disseminated in " different parts of the country, for the propagation of " teak timber. Amongst others, a few plants were sent " to Rampore Bauleah, this was in 1795. These plants " have throve in a surprising manner, and are at this " time, between twenty and thirty feet high, and near a " foot in diameter; the wood of the hardest kind, and, as " far as can be judged at present, greatly superior to the " Teak of Pegu."

WILLIAM ROXBURGH.

Calcutta.

To C. Taylor, M. D. Sec.

The

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The THANKS *of the Society were this Session voted to Dr.* ALEXANDER ANDERSON, *of the Royal Botanical Garden at St. Vincent, for Sago produced by him there, and the Yellow Dye yielded by the Gardenia Florida. The following Communication was received from him, and Specimens of the above-mentioned Articles are preserved in the Society's Repository.*

SIR,

I AM sorry that after my long silence I can produce so few observations deserving of the Society's attention; this has been owing to my very bad state of health, which has incapacitated me from my wonted exertions. My Sago plants are now encreased to some hundreds, and I have sent to you some samples of their produce. The specimens now sent, are about half of the quantity that I obtained from a stem about seven inches in diameter, and two-and-a-half feet in length, the other half was used by a sick gentleman residing with me. The smallest parcel is from the cortical part of the stem, but it is not one-third of the quantity which it would have yielded if I had the means of pounding it properly. I have no good contrivance for that purpose, and did not persist in getting out all its substance, considering it not of equal value with the pith, although a medical gentleman here thinks it more similar to the real Sago. The largest parcel is prepared from the pith, which, being divested of fibres, renders its preparation more easy, as it requires no process but pounding, rubbing, and dissolving in water.

I have

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I have sent some small specimens of cloth dyed yellow, they were done about a year ago, with the juice of the fruit of the gardenia florida, I believe in March 1810.

No. 1, Paper coloured yellow with the fruit of the plant.
2, Cloth dyed in a simple cold infusion in water.
3, Do. Do. afterwards dipped in a solution of allum.
4, Do. Do. previously put in a solution of allum.
5, Do. Do. Do. in a solution of sea-salt.
6, Simple infusion, dipped in alcaline ley.
7, Infusion in alcaline ley.

I fear they will deserve but little attention, as yellow is a common colour, and obtained from a variety of productions, though I observe that a small quantity of this juice yields a considerable quantity of colouring matter.

I am, with great regard,
Sir,
Your very humble servant,
ALEXANDER ANDERSON.

Botanic Garden, St. Vincent,
April 23, 1811.

To C. Taylor, M. D. Sec.

PRESENTS

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PRESENTS

RECEIVED BY THE

SOCIETY,

FROM JUNE, 1811, TO JULY, 1812.

With the Names of the Donors.

Royal Society.

Part I. and II. for 1810, and 1811, of the Transactions of the Royal Society.

Society of Antiquaries.

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ERRATA.

In page 71, line 14.—In Mr. FRANKLYN's account of his method of feeding Milch Cows, *one Penny* per day has been inserted instead of *one Shilling*, the cost of firing mentioned in the preceding Statement.

In page 70, line 6 of the same communication—Add the following observations:—

"I first put some water into the boxes, and then fill them with hay cut into chaff. I add a large quantity more of water when the first water is become hot and proceed to heat it by steam. My Cows have the boiled food three times a day, I give each of them at one time three gallons of the boiled chaff, and three gallons of the liquor."

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